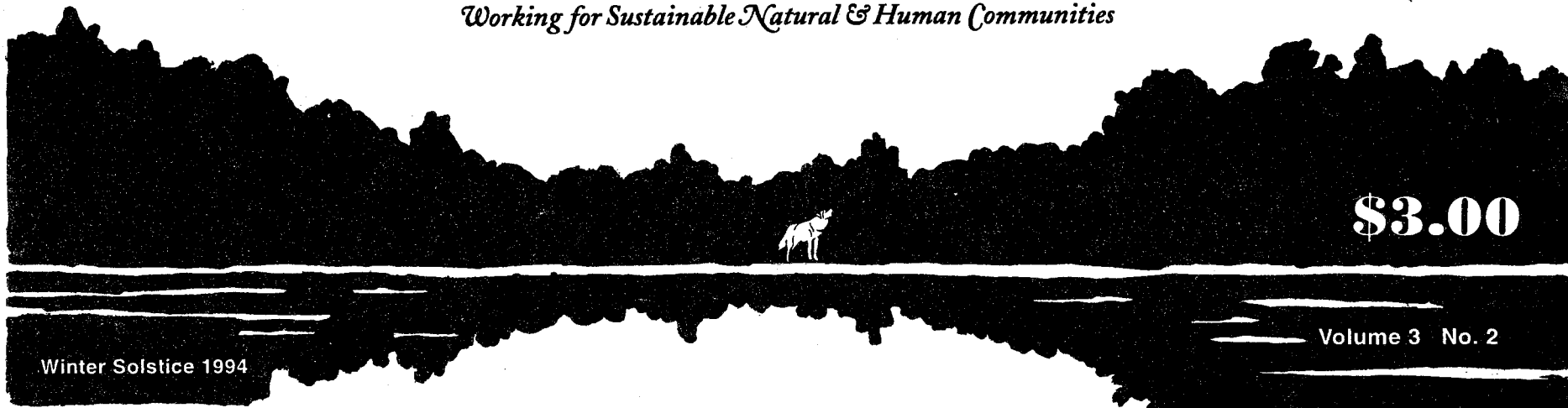


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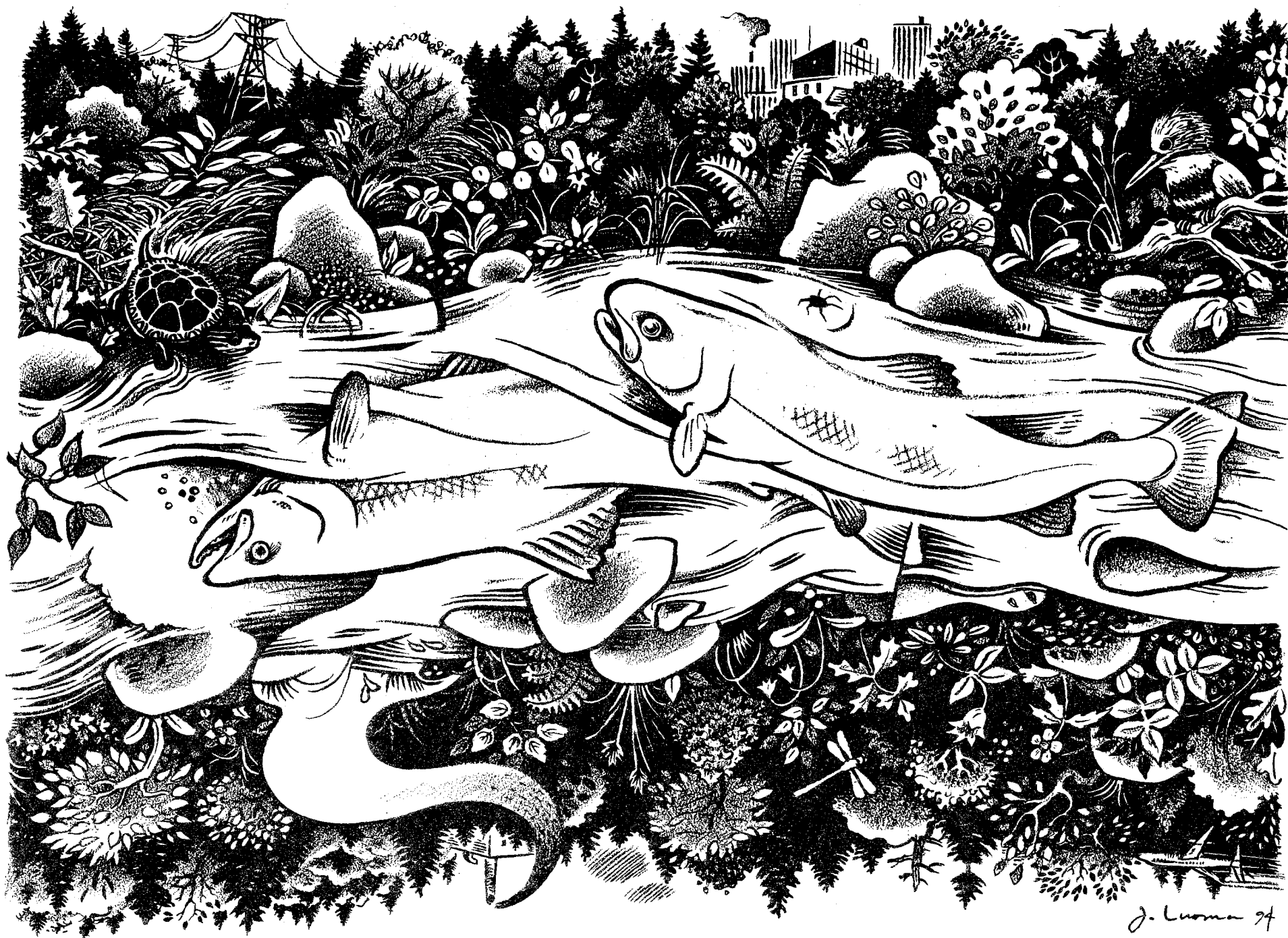
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# The Northern Forest Forum

*Working for Sustainable Natural & Human Communities*



## Needed - An Ecologically Sustainable, Socially Responsible Regional Energy Policy



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Printed on Chlorine-Free Paper

# Politics of Anger Won't Solve the Ecological Crisis

"No one ever went broke underestimating the intelligence of the American voter."

—H. L. Mencken

Do the recent stunning election results mean the U.S. has gone Republican? Anti-environmental? Against big government? With the shift in power, are we now on the road to resolving the most dangerous and pressing problems of the age?

The answer to all these questions is no!

Most voters voted *against* the incumbent, not *for* the Republicans.

They voted their anger, not for a unifying and ennobling vision.

Although some friends of the environment lost, and too many anti-environmentalists won, voters in conservative Arizona defeated a "takings" bill advanced by the property rights/wise use extremists.

While the public voted against tax and spend centralized government, the recipients of their votes—the Republicans—are hardly likely to dismantle the elements of the federal government most responsible for voter anger and despair—policies such as GATT and tax laws that subsidize transnational corporations and destroy local self-sufficiency.

And, despite all the hoopla, despite all the promises to end the inefficiencies of big government, to throw the poor out on the streets—if they aren't there already, the promises to restore state-sponsored school prayers, to cut the taxes of the wealthy and gut regulations (especially regulations designed to protect the environment), the Republicans will not address the most fundamental, the most intractable environmental problems of our age—problems that won't go away simply because they



aren't on Newt Gingrich's radar screen.

\* \* \*

Two paradoxes of the election illustrate the muddled message sent by the voters: the alleged economic "recovery" did not help President Clinton and the Democrats, and the clamor for "local control" resulted in a landslide victory for the party that has mastered the art of local control rhetoric whilst advancing the agenda of the transnational corporations.

I suspect that the reason voters did not show the Democrats more gratitude over the supposed economic recovery of the past year or two is because they haven't felt it in their personal lives. It has been a "productivity" recovery, not a "jobs" recovery. The corporations have regained profitability by "downsizing" their work force, not by creating new jobs or bolstering job security. If you don't believe me, ask the residents of any Northern Forest mill town. Conclusion: the centralized, pro-transnational corporation policies of both Democrats and Republicans are not benefiting the average voter.

The Republicans played skillfully on voters' growing desire for greater control over their affairs on a local level. Republican rhetoric against big government, for states rights and local control sounded good, but don't expect any more progress on the local control issue than President Reagan made balancing the budget. If the Republicans were sincere about getting rid of big, centralized government, they would reverse government policies that favor the transnationals and hurt local and regional initiatives. Instead, they have suggested abolishing the Small Business Administration, and they favor passage of GATT which will make it even easier for the transnationals to evade responsible environmental and labor practices.

\* \* \*

If you are looking for an analogy to today's political, social and moral crises, try the 1850s. For decades Congress evaded dealing with the issue of slavery through clever, but disastrous compromises—the Missouri Compromise of 1820 and the

Compromise of 1850. Still, the issue wouldn't go away. The 1857 Dred Scott decision by the Supreme Court put the nation's legal system officially on the side of slavery. Politically, the Know-Nothing Party anticipated the legions of Perot and Limbaugh. Property rights—slavery—was a central issue in the rupture between North and South.

Throughout the 1850s, the Democratic Party—the party of slavery—was able to hold on to power until it collapsed with the onset of the Civil War. The opposition party of the preceding decades—the Whigs—disintegrated after the 1852 election, as bereft of ideas and vision as today's Democrats. Out of the ashes of the Whig Party grew the party of Lincoln, the party that eventually ended slavery.

What is most characteristic of the decades prior to the Civil War is the inability—or unwillingness—to face up to the central issues of the day.

\* \* \*

In the mid-1990s the Democratic Party has lost it way. Mainstream environmental groups having grown moribund advocating a strategy of compromise and inside-the-beltway political maneuvering, are in nearly as much trouble as the Democrats are. The Republicans have mistaken their victory as a mandate for their right-wing social agenda. Soon enough, they'll learn that anger—like quicksand—is a poor foundation upon which to build.

Meanwhile, the environmental crisis will grow worse. Our species has overshot the limits of this finite planet to provide for our habits of economic growth fueled by consumption and waste. As natural ecosystems unravel, conflicts over ever scarcer "resources" will grow ever more dangerous.

We have already run out of places to store the wastes we produce. Global warming, the hole in the ozone, mercury and dioxins in Maine's fish are clear warnings that we can no longer evade the environmental consequences of our actions. The "Contract on America" ignores this real crisis.

\* \* \*

The *Forum* will continue to promote sustainable natural and human

communities. We share voter anger at the failure of centralized government. We understand that economic recovery that doesn't help the average citizen and doesn't alleviate environmental stress is a sham. We reject Republican proposals for lowering taxes for the wealthy—capital gains, for instance, and for promoting policies that subsidize centralized corporations while undercutting the interests of local, small-scale entrepreneurs.

When the regulations-bashers and welfare-baiters acknowledge the harm to natural and human communities caused by the transnationals who underwrite their election campaigns, then we'll have a genuine revolution on our hands. For now, whether a Democratic or Republican Congress, the corporations win and the rest of us lose.

So the anger will grow more unfocused, more destructive.

Meanwhile, the *Forum* will continue to work with those who are trying to offer a strategy that is ecologically realistic, economically sustainable, politically equitable, and morally generous. While the demagogues corner the market on despair, we'll continue to offer a realistic and hope-filled alternative vision.

—Jamie Sayen

## Illustration Credits

Cover, p. 5—Jon Luoma  
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The Northern Forest Forum is published by The Northern Appalachian Restoration Project of Earth Island Institute

## Reader Objects to Clearcut Caption

Dear Editor,

I would like to address some of the inaccuracies on the caption of the West Middlesex-Big W aerial photo from your Mid-Summer 1994 issue (page 7).

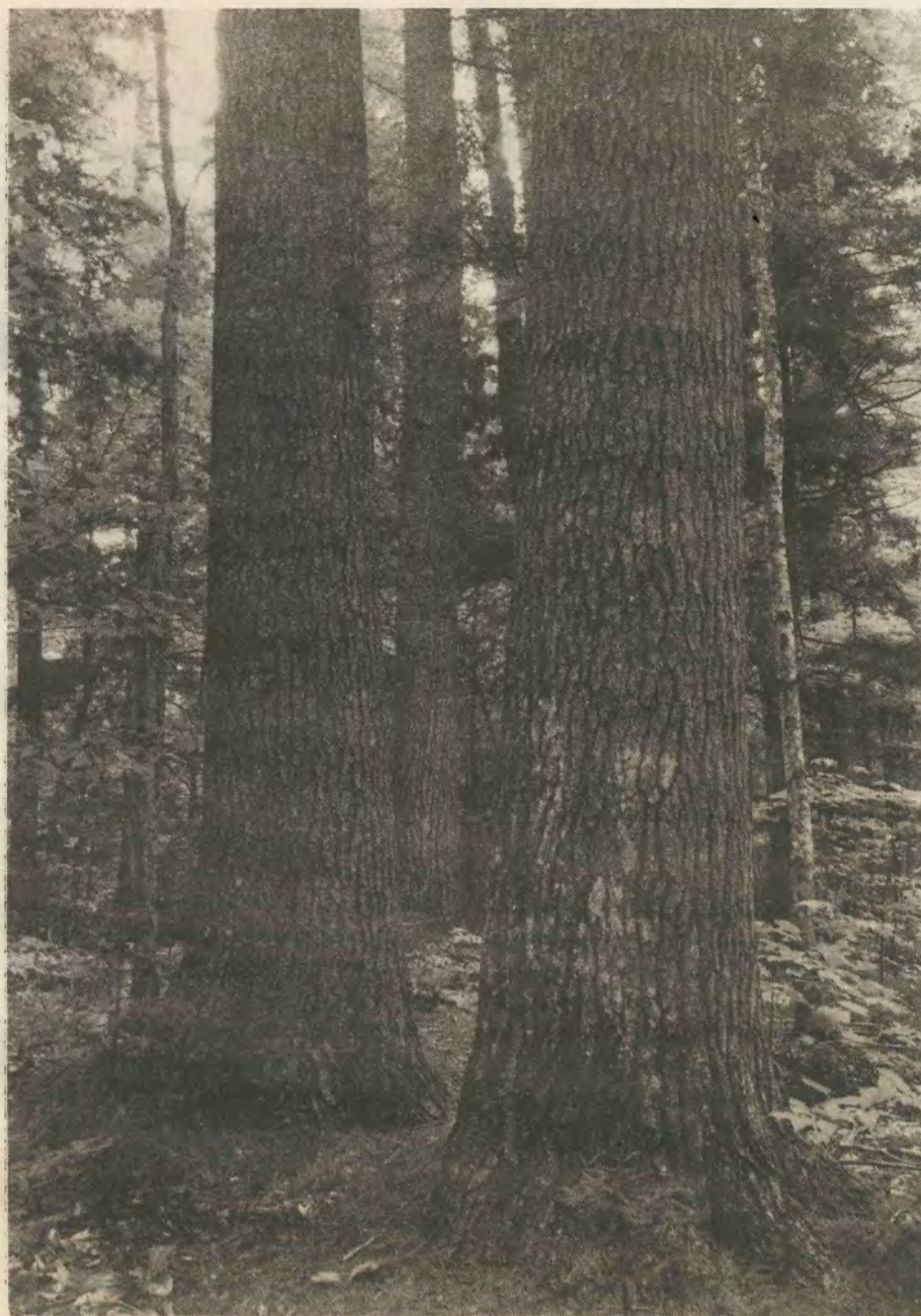
You imply that the entire area was planted with "genetically alien stock." Actually, less than 10% of the area harvested was ever planted, as the natural regeneration did very well. Most of the operations in Big W occurred five to ten years earlier than those in the southern portion of West Middlesex, so most of these natural stands are now 20 feet or more tall. Those of us who have seen this area from the ground can verify that the forest was not liquidated as you contend.

Before becoming involved with research here in the Amazon region, I worked extensively on both of these townships as a forester for Scott Paper Co. One of my first assignments was a timber cruise of the southern half of West Middlesex. At that time, the summer of 1977, the area was covered by

mature softwood stands with balsam fir as the dominant component. Spruce budworm feeding had been severe, with patches of spruce and fir already dead and widespread mortality inevitable. Having seen that entire area on foot, I can tell you that had the trees not been harvested, there would have been a situation similar to the Baxter Park Blowdown, which in 1978 became the site of the Baxter Park Fire.

Thank you,  
Mark Armstrong  
Manaus, Brazil

*Editor Responds: I regret if the caption implied that Scott replanted the entire two township clearcut. But, I'll stick by my belief that nothing justifies this kind of forestry. Plantations of genetically alien stock of any size are ecological nightmares. Those interested in a thorough history of the spruce budworm spraying program in Maine in the 1970s and 1980s should consult **Beyond the Beauty Strip: Saving What's Left of Our Forests** by Mitch Lansky, Tilbury House, Gardiner, Maine, 1992, pages 204-241, 264-270 and 322-333.*



*Old growth stand in the Hermitage in Maine. Only 0.22% of Maine's Northern Forest is old growth. Our generation can leave a precious legacy to future generations by beginning to regrow old growth by the establishment of large ecological reserves. Photo by John McKeith.*

## Toxic Vacationland

*Warning: Maine Can Be Hazardous to Your Health*



Those of us who love Maine prefer to think of the Maine Woods, the wild rivers, the coast, the birds and wildlife. But, the truth about Maine is far less romantic. Irresponsible governmental inaction on pollution and environmental protection has produced a toxic calamity for fishermen, hunters, birdwatchers and lovers of the wild. Since 1986, the state has been forced to issue at least six poorly publicized health advisories regarding poisoned wildlife. When are Mainers going to force their government to end its criminal collusion with our toxic culture? When are tourism brochures about Maine going to tell the truth about Toxic Vacationland?

**1986:** Maine's Department of Inland Fisheries & Wildlife advised hunters not to eat organ meat (liver or heart) of moose or deer over one year of age because they contain dangerous levels of the heavy metal cadmium.

**1988:** Maine issued an advisory for dioxin in fish from lower stems of three major rivers: the Androscoggin, Kennebec, and Penobscot. Dioxin is a by-product of chlorine paper bleaching, and the advisory is still in effect.

**1991:** High levels of mercury were found in the remote Allagash Lake.

**1991:** A study showed high levels of mercury in eagles. Bald eagle reproduction is lower in Maine than any other bald eagle population in the United States due to high levels of dioxin, mercury, DDT and PCBs. DDT was banned in 1972, yet it persists. This study found some of the highest levels of PCBs recorded in the world.

**1993:** A mercury study found 20,000 parts per trillion in loons. A Maine Department of Health Services "health advisory" warned prenatal women, nursing mothers, women who may become pregnant, and children under age eight not to eat any fish caught in lakes and ponds in Maine. All others were warned not to eat more than 6-22 meals a year.

**1994:** Dangerous levels of Dioxin were found in Maine Lobsters. Especially dangerous is the tomalley of lobsters, considered a delicacy.

## NH Governor Wants to End Funding of State's Natural Heritage Program

The New Hampshire Natural Heritage Program (NHNHP) is in deep trouble. The Commissioner of DRED (Department of Resources & Economic Development), William Bartlett, has deleted from next year's state budget the paltry \$70,000 the NHNHP receives annually.

Bartlett admitted to Eric Aldrich of the *Keene Sentinel* (October 18, 1994) that he has little understanding of what the program does. "Is this something the State of New Hampshire needs?" he asked.

The Heritage Program monitors the state's 266 endangered or threatened species, reviews state wetland permits, planned highway projects, and some planned timber harvests to help avoid conflicts between economic growth and natural resource protection. And it is the equivalent of the canary in the mine shaft—it can sound an early warning when species and communities are in trouble.

The invaluable Natural Heritage Program is even more important in light of Recommendation 21 of the Northern Forest Lands Council that states should conserve and enhance biological diversity across the landscape. Critics of the Council's obsession with "states' rights" on issues such as protection of biodiversity, point to Bartlett's move as proof that the state of New Hampshire lacks the resources, understanding or vision to do the job adequately.

The NH Legislature's committee that reviewed the NFLC recommendations understood the importance of the Natural Heritage Program and has strongly recommended to the full Legislature that full funding be restored. Responsible leaders of the state's timber industry, especially Charles Niebling, Executive Director of New Hampshire Timberland Owners Association, have defended the Heritage Program, demonstrating that the fate of the biotic integrity of the state and region transcends partisan lines. Here are two proposals:

1) Triple the NH Natural Heritage Program's budget to \$200,000 so that it can begin to address the issues raised by the NFLC and the public regarding the establishment of ecological reserves.

2) Remove natural resources agencies from the jurisdiction of DRED. No commissioner—even one who does understand biodiversity issues—can preside over state policy for both economic development and the protection of biotic integrity. The conflict is fundamental, and invariably, short-term economic interests win out over long-term protection of our life-support system.

—Jamie Sayen

# Maine Woods Watch

by Jym St. Pierre & Michael Kellett



The Maine Woods is the largest tract of wildlands in the eastern United States. However, today this region is under siege. Maine Woods Watch is devoted to documenting the good, the bad, and the ugly in the Maine Woods today, with an emphasis on opportunities for citizen action to protect and restore the essence of the region, its wildness.

**\*Election Results.** Elections for major offices this fall have provided reasons for both optimism and concern. Victors in key races include Angus King (Governor), Olympia Snowe (US Senate), Jim Longley (US Congress—southern Maine) and John Baldacci (US Congress—northern Maine). King has a mixed environmental record. He lobbied for the state's returnable bottle bill and billboard law and helped establish the Land for Maine's Future program. But he wants to gut the car emissions testing program and build the marine terminal at Sears Island, which would be used to export hundreds of thousands of tons of wood chips annually. King told the Maine Forest Products Council recently that clearcutting is a "legitimate forestry tool" that should not be banned. Snowe, who earned a 62% score from the national League of Conservation Voters (LCV), has shown limited leadership on conservation opportunities for northern Maine. Baldacci, who earned a zero from the Maine LCV, has hired a couple of aides familiar with environmental issues, but he has also hired a part-timer who will continue to work full-time for Champion International Paper Company. Longley, who has done consulting work recently for the Paper Industry Information Office, the lobbying arm of the industry in Maine, has paid little attention to environmental issues to date, but with public support he may cultivate an interest. Snowe, Baldacci and Longley, like King, support construction of the Sears Island cargoport. \*In other election day news, a \$10 million bond issue to refurbish and expand fish hatcheries failed. A petition drive to create a lottery game to raise money for conservation programs (the Maine Outdoor Heritage Fund) has gathered about two-thirds of the signatures needed to put the question to public referendum next year.

**\*Power to the People.** Voters in Jay, home of International Paper's Androscoggin mill, have endorsed the first steps toward forming a local energy utility. Under intense lobbying pressure from Central Maine Power, citizens in Westbrook, home of an old S.D. Warren mill, rejected a similar referendum. The town of Madison, location of Madison Paper's plant, has long had a successful

local utility. \*Residents in Millinocket and East Millinocket, feeling rather powerless, voted to settle tax abatement disputes out-of-court with Great Northern Paper.

**\*Water & Wind.** A federal draft EIS has concluded that building the proposed Basin Mills Dam would not preclude restoration of Atlantic salmon in the Penobscot watershed. Conservation and fishing groups disagree and are litigating recent state approval of the dam. \*A draft EIS on Great Northern's relicensing application for its Ripogenus and Penobscot Mills hydro projects is due before New Year's. Native American tribes are seeking federal protection of their interests along the river which are threatened by both the Basin Mills and Great Northern dams. \*California-based Zond Energy Co. has backed out of its support of Maine-based Endless Energy Company's plan to site three windmills on Sugarloaf Mountain and has put into doubt plans for a 30-turbine facility on nearby Redington Range. \*Kenetech Windpower's proposal for a gargantuan 639-turbine wind facility in the Boundary Mountains is running into gusty weather with the Land Use Regulation Commission which is expected to decide on the application this winter.

**\*Greenwash?** The Maine Forest Products Council has hired a new staffer with extensive TV, radio and newspaper experience. One of its top priorities is to garner favorable television coverage of the forest products industry through the production of programs for "Earthminders," an educational ITV series broadcast from the University of Maine at Augusta. \*Seven Islands Land Company has been touting "green certification," which the company purchased last year, in local national and international news media. Seven Islands, manager of nearly a million acres of forest in Maine, was able to acquire "well-managed" certification, despite findings by Scientific Certification Systems of exceeding calculated allowable harvest, widespread conversion to low-value, unnatural forest communities, inconsistent application of silvicultural guidelines, decreased biological diversity, lack of a formal wildlife plan, and cutting too close to streams for optimal sediment filtering and canopy shading. \*Great Northern Paper's "Invite a Forester" program is taking its slide show on the road again to schools around the state. \*The American Forest & Paper Assn. has issued a glossy new tabloid that suggests extensive clearcutting in Maine in recent years was intended to help moose proliferate: "In the 1970s, the Maine forests were home to maybe 5,000 moose....Then folks in Maine got serious about forest manage-

ment...foresters say today's moose population comes to about 25,000." \*A new national group, the American Loggers Council, has been formed to "address issues facing the logging industry."

**\*Let's Make a Deal.** There are few ownerships remaining of the old timber baron families and more are going. The Goodsoe Estate has sold its 41,000 acres. Meanwhile, lands of the Cassidy/Dyer family are caught up in a messy divorce. The Hancock Timber Resource Group purchased the Goodsoe properties. Hancock, which snapped up 238,000 acres from Diamond Occidental in 1993 and 24,000 acres from International Paper earlier this year in Maine, expects to buy additional lands from Bowater soon.

**\*Industry in Transition.** Bowater Inc. and its subsidiary Great Northern Paper have new CEOs who hope to financially turn around Maine's largest forest landowner. Arnold Nemirow, new Bowater President, spent 16 years at Great Northern Nekoosa before leading Wassau Paper to record profits from 1990 to 1994. Donald McNeil, new GNP President, has been with Bowater for 17 years and comes to Maine from the company's Nova Scotia operation. \*Speaking of Bowater and Nova Scotia, the company just cleared \$10.6 million from the sale of "non-strategic" forestlands there. \*James River Corp. grew exponentially in the 1970s and 80s through 54 acquisitions in 25 years, including a large mill in Old Town. However, in the 1990s during the paper industry's worst slump in half a century, JR has had to sell mills and lands and cut thousands from its work force. Now the company is embarking on another downsizing to cut debt, including possible sale of its mill in Berlin, New Hampshire. \*Donaldson, Lufkin & Jenrette, the Wall Street securities firm that put together the purchase of the S.D. Warren Division of Scott Paper (see *Forum*, vol. 3, # 1), is in hot water for questionable financial activities. \*Vic Firth Inc. of Massachusetts recently bought the 125-year-old Banton company, a Newport wood products manufacturer, one day before the plant was to close its doors. \*Domtar, a Canadian company with interests in Maine, has sold its newsprint and groundwood papers division and fired its chairman and its CEO. \*While painful in the near term, a downsized forest products industry is not always bad news in the long run. In Oregon, where protection of old-growth forests was predicted by the industry to forecast inevitable ruin, economic catastrophe has been averted according to the *New York Times*. Overall employment and wages have risen.

**\*Dirty Business.** According to the latest EPA data 11 of the top 13 biggest

water polluters in Maine are pulp and paper mills. International Paper's plant in Jay and Georgia-Pacific's mill in Woodland discharged nearly twice as much toxic effluent as anyone else on the list. Several of the paper companies say things have improved in the past few years. IP and G-P, for instance, are shifting from some of the most toxic chemicals or installing new pollution prevention hardware. \*Residue of DDT is still being found in the cold, acidic soils of northern Maine where the pesticide was sprayed three decades ago to suppress spruce budworm. Now banned in the US, DDT is showing up even today in bald eagles at the top of the food chain. \*Mercury, dioxin and other toxins are also being found in the Maine Woods.

**\*Good Dirt.** The Land for Maine's Future Board has closed on the purchase of conservation easements covering a 500-foot-wide strip along more than 16 miles of Spednic Lake. The \$775,000 deal complements an earlier LMFB acquisition on the lake, though some conservation activists criticized the arrangement as a poor deal for the public. \*Environmental groups networking under the umbrella of the Northern Forest Alliance have begun to put a little more definition to a broad proposal released last spring calling for ten large conservation areas in the Northern Forest region, including five in Maine. \*RESTORE: The North Woods has not only provided plenty of definition to its proposed Maine Woods National Park, it has also distributed 30,000 brochures about the park. \*The Conservation Fund is seeking a good home for 10,000 acres it bought five years ago in eastern Maine. \*Dick Spencer and Ed Kfoury have received the Calder Conservation Award for protecting 10,000 acres in the Rangeley area.

**\*Trees to Go.** Since the state's Forest Practices Act was passed in 1989, over 2 million acres have been logged (including hundreds of square miles legally clearcut) and more than 1.5 million acres are scheduled for cuts during the next two years. \*Much of this wood fiber goes offshore. This is the first year that rolled paper has been shipped regularly from Eastport. The latest shipment, twenty-five hundred tons from Georgia-Pacific, went out in November headed for Korea. \*A bit of the wood stays here. Guy Gannett Newspapers have agreed to buy all of the paper for its four newspapers in Maine from Great Northern Paper. \*Five timber bridges have been built in Maine since 1991 and five more are planned under the federal Wood in Transportation Program. Red maple and hemlock, considered underutilized species, are being used to demonstrate

# Toward a Northern Forest Regional Energy Policy

by Jamie Sayen

The controversy over the proposed development of the Boundary Mountains in western Maine (see *Forum*, vol 2 #6, page 14) for 639 windmills, 58 miles of new roads, 56 miles of upgraded roads, and over 20 miles of transmission lines in an area identified by 20 members of the Northern Forest Alliance as a Conservation Priority Area (I prefer "wildlands" area), has brought energy planners into direct conflict with wildland protectors.

We need to develop a regional energy policy that compliments, not conflicts, with efforts to protect wildlands through the establishment of ecological reserves.

## Current Energy Supply is Fragile

1) Due to projections of the shutdown of several nuclear plants in the next 20-30 years, the uncertainty of renewing Hydro-Quebec contracts after they expire early in the next century, and the need to address greenhouse gas emissions from fossil fuels, the energy situation in the region is indeed precarious. Nuclear and oil power account for 62% of the region's energy use. Replacing them will be a huge task, if we accept the assumption that the region will continue to consume approximately 26,000 MW.

2) There is a major push to promote natural gas as "clean" energy. But it isn't.

3) Conservation & Efficiency efforts are losing ground. There are pressures to roll back C & E efforts. Instead, as industry and politicians continue to orchestrate an anti-regulatory atmosphere, utility companies are promoting electricity use and engaging in retail-wheeling. We must promote avoidance from frivolous energy uses,

and tie gains from conservation, efficiency and avoidance to a reduction of overall energy use, not as a way to permit further growth under current capacity.

## "Renewables"

1) So-called "Renewables" may be able to replace nuclear and fossil fuel sources, but: (a) current capacity is low; (b) environmental impacts of renewables are often glossed over by their proponents who focus attention only on the fact that they do not produce CO<sub>2</sub>; and (c) they must truly replace a nuclear plant or oil use (i.e., opening a new wind project must be tied to the closure of a nuclear or oil facility), otherwise, the renewables become additive to, not replacement of undesirable sources.

2) What is the maximum potential capacity for renewables such as biomass, hydro, wind and solar if:

(a) there are few environmental restrictions on the development of these sources? or

(b) there are strict environmental restrictions and large ecological reserves are established in the ten wildlands areas identified by the Northern Forest Alliance groups?

\*CLF estimates that (if we uncritically accept current levels of growth and current end uses of electricity) we will need about 13,000 MW from these sources in order to replace nuclear and oil sources.

\*But, most hydro potential has already been developed, and there is growing opposition to existing dams.

\*How much biomass will be available, especially if the Sears Island Port is built so we can export wood chips?

\*What are potential windmill sites that do not conflict with wildlands strategies and that do not adversely impact bird populations?

\*Why are we not more aggressively promoting small-scale solar?

## Basic Issues for a Regional Energy Policy

1) We need a comprehensive regional energy policy before we accept any new proposed projects. Otherwise, we simply preside over the piecemeal sacrifice of the Northern Forest. This policy must be developed through a public debate that demystifies, not obscures, energy policy issues.

2) Will control of energy be centralized as it is currently, or will we move toward a decentralized, community-based energy policy? How do we design a successful decentralized policy? Should the Northern Forest promote itself as an energy colony?

3) Have we exhausted conservation, efficiency and energy avoidance measures? There should be no new projects until we have.

4) What is the need for a proposed project? Does the region really need the electricity? Is the electricity for frivolous or necessary end uses? Have we exhausted all conservation measures? Will the energy generated be used locally or will we sell it to another region?

5) Is the proposed new project directly tied to the decommissioning of an existing nuclear or oil facility? If not, how do we reduce polluting energy sources if our "renewables" are additive, rather than replacement?

6) Land Use Issues: What are the land use issues associated with proposed project. Hydro, wind and biomass projects impact a far greater amount of land than just the site for the project. We must examine all projects from a landscape ecology perspective and assess cumulative impacts of existing and proposed projects.

7) Externalities: Traditionally, society lets polluters and developers pass externalities on to society. Recently Massachusetts and Vermont have required that externalities be evaluated

when examining a proposed project. All externalities associated with a project must be internalized. Then we'll find out just how attractive a project is economically.

8) Mitigation has been proposed as a centerpiece of the wind power deal. From an ecological point of view, mitigation means: protecting or attempting to restore one tract as the price for permitting the development of another. Does mitigation really restore damaged ecosystems? Is it a reasonable price to pay for protection? Is it responsible for environmentalists to sacrifice one area to protect (or try to protect) another area?

9) How can we promote a public dialogue that promotes the establishment of a responsible energy policy?

The *Forum* is pleased to offer this special section on New Energy Policy issues. We hope it will help to stimulate the sort of regional dialogue that is necessary if we are to develop and implement an energy policy that is environmentally sustainable, economically fair, meets local needs, and promotes socially appropriate values.

In this special section, Mitch Lansky outlines the social policy issues we must address. He argues for a decentralized, democratic strategy that allows people to regain responsibility for their lives.

Next, the energy staff of the Conservation Law Foundation (CLF) provides a brief "energy primer" for New England, including a look at the environmental costs of the current energy policy and the potential of "renewable" energy. CLF also analyses dangers and opportunities posed the current movement to deregulate energy.

Finally, Pamela Prodan examines existing obstacles to a sustainable energy policy that are built into current laws and policies governing energy policy.



value-added forest product manufacturing. Beats chipping and/or shipping them. \*The US Forest Service has reversed an earlier decision and doubled its subsidized planned cut on the White Mountain National Forest for next year to 18 million board feet. The forest industry wanted a cut closer to the 29 million board feet slated for removal this year.

\*Wasting Away. Recycling of wastepaper is booming, up to 39% last year nationally. At least four mills in Maine have significant recycling programs. In fact, Great Northern reports a serious shortage of wastepaper for its

huge recycled paper plant. Prices for old newspapers have quadrupled to \$100/ton. \*Stone & Webster Development Corp. has chosen Auburn for the site of a planned \$65 million Virgin Pulp Substitute plant. \*Millinocket is not wasting time trying to diversify beyond paper. The town has a committee working to attract a value added primary or secondary forest products manufacturing plant. \*Landowners in the Maine Woods increasingly report problems with wastes being illegally dumped. Some are considering limiting access to control the problem. \*James River Corp. has introduced a new toilet

paper that is supposed to be the first brand not to disintegrate when wet. More persistent waste?

\*Call of the Wild. State wildlife biologists will search for wolf tracks and calls this winter in the Maine Woods. \*In northern Minnesota where their populations are steadily recovering wolves have been bolstering local tourism. A lesson for Maine? \* Another species, the peregrine falcon, has been recovering well in Maine over the past decade. Five pairs raised ten young in 1993. This year half a dozen more peregrines were released at Borestone Mountain. By the way, the first child

born of English parents in New England was named Peregrine White, born in 1620. Happy holidays.

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# A Socially Appropriate Energy Policy for the Northern Forest

by Mitch Lansky

## Introduction.

While timber may be the dominant industry of the Northern Forest, energy production is important as well. Energy producers (including paper companies, which are not only major consumers, but producers as well) are interested in:

- \*trees for biomass;
- \*trash for incinerators;
- \*rivers for hydro dams;
- \*west-facing ridges for windfarms;
- \*swaths of forest for powerline corridors (from nuclear and hydro plants in Canada); and
- \*forest "wasteland" for toxic and nuclear waste dumps.

National and regional energy policy can have a profound effect on the Northern Forest. Coal-powered plants and automobiles can contribute to acid rain and ozone. The price of gas can have an effect on population mobility, which can mean more second homes, tourism, and recreation in more remote areas.

In our society, energy policy is supposedly set by the "Free Market." This implies that consumers, by choosing the least-cost energy supplies, are casting their dollar votes for the most efficient energy systems. Unfortunately for this model, not all energy producers are truly competitive. Some are state-sanctioned monopolies. And some energy systems get government financial "encouragement."

Even without government interference, market prices do not reflect all values. Because of this, environmental groups have lobbied for government intervention to correct what the market misses. Such intervention includes regulation of harmful activities (such as air pollution), and creation of policies favoring conservation or renewable energy sources.

Environmentalists are not the only lobbyists in town. Fossil fuels and nuclear energy are already getting major governmental favors. Even among environmentalists there are heated debates over the merits of "renewables" such as hydro, biomass, or wind plants built to a large scale.

## Ecological Impacts

Besides the obvious problems stemming from vested industrial interests lobbying for more benefits, there is genuine confusion over a full accounting of the costs and benefits of various energy options. People tend to look only at impacts of production, but full cost accounting would look at cradle to grave impacts of whole processes. Many of the ecological and social impacts are external to normal cost accounting. Indeed, putting an accurate price on ecological or social impacts is arbitrary. Ecological and social values are best measured by ecological and social criteria, rather than market criteria.

For full-cost accounting, we need to look at such impacts as:

- \*conversion of landscape;
- \*changes in water flow and temperature of rivers;
- \*creation of toxic or hazardous materials;
- \*pollution of air, water, soil, plants, and

- animals;
- \*energy expenditures (it takes energy to get energy); and
- \*depletion of non-renewable, or non-recyclable materials.

We need to look at these impacts at the following stages of production:

- \*mining of resources for fuel;
- \*mining of resources for plant components;
- \*transportation of resources for fuel and components;
- \*manufacture of components;
- \*refining of fuels;
- \*construction of plant;
- \*operation of plant;
- \*transport of energy;
- \*use of energy;
- \*dismantling of plant;
- \*disposal of plant components; and
- \*disposal of plant by-products (including radioactive or toxic wastes).

## Government Costs

Energy prices do not always take



Using renewable energy in a centralized manner leads to all sorts of inefficiencies and abuses. This biomass plant in Bethlehem, NH is surrounded by a massive clearcut. Photo by Peter Riviere with assistance from the Environmental Air Force.

into account government expenditures which can include:

- \*research;
- \*policy agencies;
- \*public relations;
- \*tax "incentives";
- \*subsidies;
- \*cheap "rent" on public lands;
- \*insurance caps;
- \*identification and development of toxic or nuclear waste facilities;
- \*military support (to ensure stable supplies of resources from "unstable" regions of the world);
- \*regulatory agencies; and
- \*"infrastructure" (such as roads, sewage systems, waste disposal, police protection).

These are all costs that the public pays, though not necessarily on their utility bill.

## Distribution of Power

Production of energy entails distribution of both electrical and political

power. Certain forms of production tend to concentrate political power and influence—a trend which is not conducive to a healthy democracy and can be considered a social cost. The technology and structure of power production can be more industrially appropriate than socially appropriate. (See box on this page.)

## Centralized vs. Decentralized Power

The above list of criteria implies a social benefit of decentralized versus centralized power production/consumption. For example, in this region, solar, wind, and wood are diffuse power sources that can easily be used in a decentralized manner. For space heating, for example, a tight, well insulated house with south-facing windows and thermal mass (for heat storage) can, with a backup wood supply from local woodlots, maintain comfortable temperatures. The benefits of power production remain with the consumer.

In contrast, using wind or wood in a centralized manner to heat houses leads to increased inequities and increased waste and ecological disruption. The power source is controlled by an absentee corporation. Concentrating the production leads to increased damage to the landscape—not only from the biomass plants or wind farms, but also from the powerline corridors. These powerlines, needed to connect the centralized source to distant consumers, cut swaths through the forest and are maintained in brush by regular applications of herbicides.

With the biomass plant, energy is expended cutting and shipping the wood to the plant. Two-thirds of the energy in the wood is lost as waste heat during electric production. For both centralized wind and biomass, power is lost during electric conversions and long-distance transmission. Energy is lost again as the electricity is converted back to heat.

The process is even more damaging and wasteful when one considers centralized uses of nuclear or fossil fuels such as coal. These resources require destructive mining, long-distance shipping of the fuels, extensive processing, and an elaborate corporate and governmental bureaucracy to ensure both continued supply and public protection. Indeed, nuclear energy requires a quasi-military "nuclear priesthood" to keep wastes safely isolated for a period longer than the history of civilization.

## Negawatts

The standard basis for energy policy, for a long time, has been that Trend is Destiny. Growth of energy consumption in the past means we must plan for more growth of consumption in the future. Growth in energy consumption means growth in energy production. Increased production means more and more power plants.

Based on this thinking, the major issues are where the plants are to be located and what type of fuels they will use. In other words, the debate focuses on which communities must be sacrificed for the sake of Progress. Those who resist are labeled NIMBYs (Not In My Back Yard)

This simplistic notion is no longer universally held. Amory Lovins, for

### Industrially Appropriate Energy Policy

Expensive, complex, and time consuming to develop

Ownership and control limited to a few

Increases power of industry

Professionals needed for maintenance and repair

Requires centralized bureaucracy to run and protect

Absentee owned (profits leave region)

Uses local resources

Energy used locally

Communities must adapt to needs of technology

Creates rapid social/ecological change requiring expensive social and technological fixes

### Socially Appropriate Energy Policy

Easily developed at local level

Ownership and control available to many

Increases self-reliance of individuals and communities

Maintenance and repair can be done locally by owner

Allows decentralized, self-regulating communities

Locally owned (profits reinvested locally)

Resources imported

Energy exported

Technology fits into needs of community

Helps maintain social/ecological stability

# Photosynthesis and "Energy Cycling" in Northern Forests

by Greg Lowenberg

Photosynthesis, the process whereby plants create organic compounds from inorganic compounds in the presence of sunlight, is the essential foundation for all life. Plants (and photosynthetic algae) convert the radiant energy of the sun to chemical energy of plant tissues by converting the energy-poor compounds carbon dioxide and water to the energy-rich carbohydrates and oxygen. Thus, plants are like energy factories, producing a stored form of chemical energy that possesses more energy than the starting materials. Life depends on this process. It is curious that electrical power-generating facilities are (perhaps enviously) referred to as "plants", because they function in just the opposite manner, converting stored energy into an unstable form, soon to be dissipated as heat (although, like plants, they provide an energy form with higher utility to their consumers).

The concept of energy cycling is a misnomer. Energy does not cycle through ecosystems. The flow of energy is, for the most part, unidirectional, and the northern forest ecosystem is no exception. Photosynthesis by trees, understory plants, and photosynthetic organisms in lakes and streams of our northern forests are the first crucial step

in the flow of energy along trophic chains. At every step along the way, respiration by organisms results in the liberation of energy as heat, and is not available for recycling.

What *does* cycle in forest ecosystems are the mineral compounds and gases that are essential for the growth and reproduction of living organisms, including plants. Photosynthesis is both directly involved in cycling of some elements and provides the necessary energy to accomplish the recycling of others.

For example, photosynthesis is very important in regulating the carbon dioxide and oxygen content of the atmosphere. Globally, all the O<sub>2</sub> is cycled through plants about every 2000 years, and all the CO<sub>2</sub> is cycled every 300 years. Respiration by living organisms plus the combustion of fuels consumes thousands of tons of oxygen every second. Fortunately, plants produce oxygen in the photosynthetic reaction at a rate much higher than they need for their own respiration, and thus replenish the atmosphere's oxygen.

Carbon dioxide is another story. Burning of fossil fuels is currently adding over 20 billion metric tons of CO<sub>2</sub> per year, a load to the atmosphere

*Continued on page 15*

example, has introduced the notion of "negawatts." There is so much energy being wasted by our society that efficiency and conservation can save enough to shut down existing power plants rather than require new ones to be constructed.

Savings can be made in many ways:

- \*use of efficient light bulbs and motors;
- \*use of "waste heat" from power plants for water and space heating (co-generation);
- \*matching appropriate energy sources to energy uses (e.g., heat directly with heat source such as sun, wood, or even a fossil fuel, instead of using energy to heat water to make steam to drive a turbine to make electricity to convert back to heat again); or
- \*build better-insulated houses, lighter cars, or better-designed factories that require less energy.

## Where We Are Headed

Conservation and efficiency, while important, do not confront the basic issue of where we are headed as a society. Fossil fuels and nuclear energy (our major energy supplies) are based on non-renewable resources. To some extent, new technology has allowed us to better find and mine these resources, but it can not create new resources. Eventually, existing deposits will become too remote and too low-grade to economically extract. As society recognizes and regulates more of the cradle to grave impacts of these power sources, the economic limits will be reached sooner, rather than later.

Because of a lingering Trend is Destiny mentality, policy makers, in looking for substitutes for these fuels are looking for substances that can take their place in the present industrial/societal complex. We will, based on this thinking, continue to rely on centralized, concentrated power sources con-

trolled by large corporations.

The debate on energy, therefore, assumes that we will continue to build throw-away commodities. We will continue to build urban wastelands with skyscrapers reachable only by elevators. We will continue the destruction of families and communities, and have smaller and smaller social units consuming more and more consumer goods. We will still have an agricultural system based on chemical fertilizers, big machinery, irrigation, long-distance shipping in refrigerated trucks, extensive refining and processing, and marketing through supermarkets reachable only by cars.

Social critic Ivan Illich has pointed out that certain technologies, such as automobiles, now constitute a "radical monopoly." Our society is so designed around the use of cars that alternatives, such as walking and bicycling, have become impractical. The places where we live, shop, work, and get entertained are now too far apart and too inaccessible for any other transportation option. We have been able to set up such a wasteful system because it has been government policy to keep the market price for oil low—by any means, including military.

Wind and sun and other renewable resources are poor choices to fuel such trends. Few people would want to live in a landscape dwarfed by huge, noisy windfarms, massive solar farms, or millions of acres dedicated to short-rotation biomass fuel feedstock. We are running out of rivers to dam. We are also running out of salmon. Even renewable resources have limits of use and cannot sustainably supply an ever-growing industrial economy. Wind and sun energy supplies are sporadic. Decentralized users rely on batteries to even out the supply. The battery banks required to maintain a reliable supply of energy for a large city would be gargantuan, let

alone highly polluting when one factors in disposal. Batteries do not last long.

## Technological Salvation

Our current (no pun intended) direction, therefore, is not sustainable. This generation is mining up resources, consuming products, and spewing out waste products at the expense of the next. Since the logic of unlimited growth in a world of limits is untenable, proponents of this direction have resorted to a fanatic religion of technological salvation. Future generations, they believe, will come up with technological solutions to today's insoluble problems. Nuclear fusion, space stations, and bioengineering will give us unlimited energy and food. Scientists will also find ways to neutralize nuclear and toxic waste. Pollution will be a resource. So don't stop now, they tell us, when the solutions are just around the corner.

Unfortunately, the high-tech "solutions" that these technological cultists are advocating are corporate solutions. The aim of the corporations that are investing in the mega-projects of the future is not to feed the hungry or clothe the poor, but to make a profit. To increase their profits, they push for technological systems that are industrially appropriate rather than socially appropriate. The distribution of wealth and power, therefore, will continue to favor the wealthy, powerful minority.

## Changing Direction

Changing direction towards a more sustainable future will take more than turning out the light when you leave the room. It will also take more than building new wind farms rather than new nuclear or coal-fired power plants to supply ever-growing energy needs. It will require that we change the process that we now call "development."

"Development" has consisted in

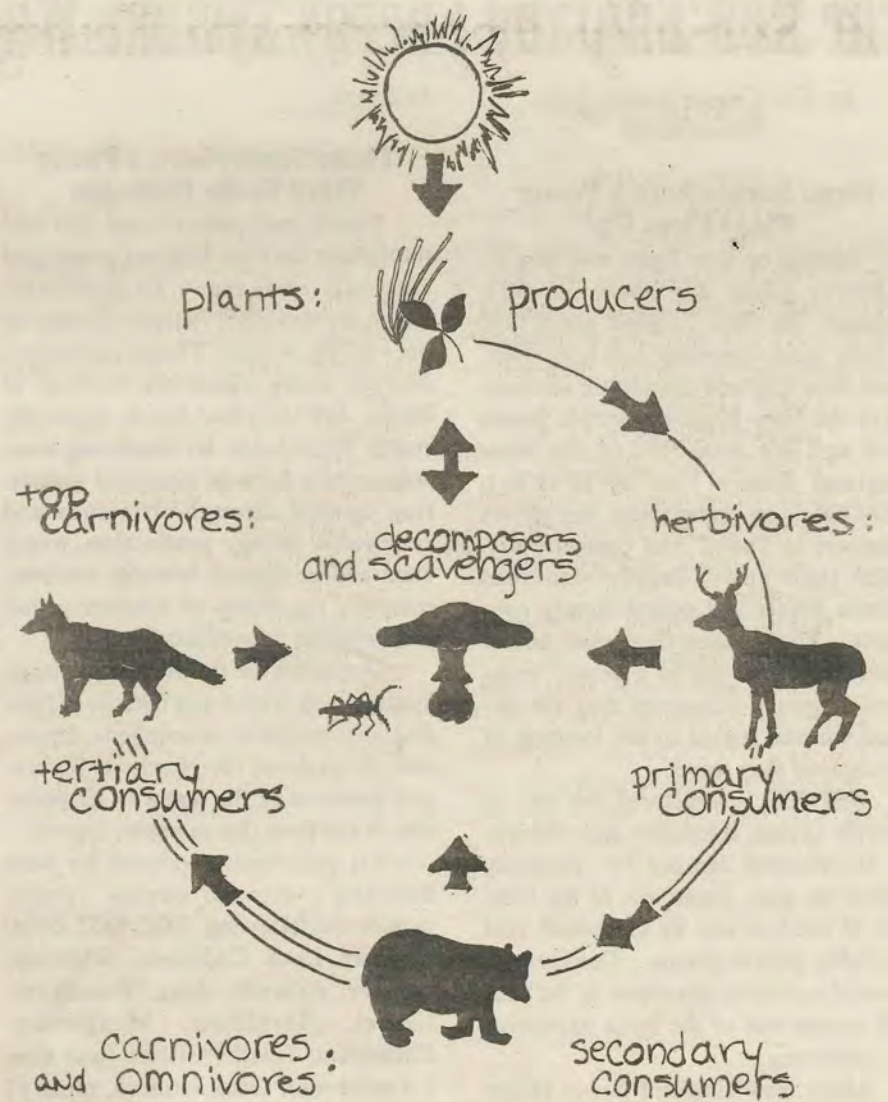
putting a consumer good or service between every scratch and its itch. It has been a war against subsistence. The more you separate people from responsibility over their own lives, the more the economy grows.

Third-world people who grow their own food, build their own houses, make their own clothes, and entertain themselves with story-telling, song, or dance are "under-developed"—they contribute little to their gross national product. Displace them from their land, put them to work on a plantation for a wage, and make them buy what they once provided for themselves, and (at least on paper), the economy booms. The economy also booms as their societies fall apart and money is spent on alcohol, drugs, prisons, hospitals, and other fixes.

At each stage that the manufacture and transport of the necessities of life are removed from the local community, more energy is needed. But using up energy also increases the gross national product and "benefits" the economy. As long as the GNP is our measure of economic welfare, we can expect to continue our "progress" toward cultural suicide.

Changing direction, therefore, means reorienting society to end the radical monopolies of cars, roads, and oil. It means incorporating many of the hidden costs that make our presently-favored energy sources artificially cheap. It means weaning ourselves from the transnational-corporate agenda for a globalized economy.

We are so off balance towards a global industrial-growth society now, that changing direction will be painful. This pain can be lessened by a leadership that recognizes the problem and institutes a long-term transition. The pain of continuing where we are headed, ultimately, will be far worse. Energy policy is not separate from social policy.



# The New England Energy System: What Happens When You Turn on a Light?

by The Conservation Law Foundation

backyard.

## First: Somewhere a Power Plant Fires Up

Turning on your lights may turn on a power plant anywhere in New England. The New England power grid is fully interconnected and integrated. Most New England utilities are connected to the New England electric power grid and are members of the New England Power Pool (NEPOOL). NEPOOL is an organization that allows members to "pool" and centrally dispatch their power supply resources (power plants and power supply contracts). That means that most power plants within it are in a sense "common" regional resources that are utilized without regard to the location of the demand they serve.

NEPOOL is structured this way to provide system reliability and efficiency. Incremental demand for electricity within the pool, regardless of the location of need, is met by the lowest cost available power plants. Conversely, demand reduction anywhere in the pool will reduce use of the most expensive unit operating.

Many New England power plants are owned by several utilities. For example, Maine Yankee is partly owned by several utilities in other states, while Central Maine Power owns portions of power plants in other states like the Connecticut Yankee nuclear plant. The regional power grid system allows power produced anywhere within the grid to be transmitted or "wheeled" to any buyers within or outside the New England grid. Power is also imported into the New England grid from sources like Hydro Quebec. This means that the overall mix of energy generation in the region and the price it can be produced at are far more important than what kind of demand or generation is in one's own

## Then: Somewhere a Power Plant Emits Pollution

Fossil fuel plants (coal and oil) throughout the New England power grid currently emit many air pollutants which are deposited indiscriminately by prevailing winds. These pollutants include many which are harmful to human and ecosystem health, especially fragile forest lands. By displacing environmentally harmful electrical generation upwind through efficiency and renewable energy production, every state and ecosystem benefits environmentally regardless of whether or not the electricity is used locally.

Operation of the regional energy system (both within and outside of New England) results in atmospheric deposition throughout the Northern Forests and exposure of the forest to air pollution in gas form (for example, ozone).

Air pollutants produced by New England's electric energy system include the following: CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>x</sub>, Mercury, Lead, Cadmium, Selenium, Copper, Arsenic, Zinc, Vanadium, Nickel, Beryllium, Manganese, Chromium, Small Particles (less than 2.5 microns). Once emitted, most of these pollutants travel long distances (up to 1000 KM+) before they are deposited on lands and waters. Given prevailing wind patterns, the New Hampshire forest for example, is thus predominantly impacted by energy emissions to the south and west of New Hampshire, as well as by local power plants.

Evidence of this can be found in the recent Health Advisories issued by both Maine and Massachusetts warning pregnant women, nursing mothers, women who may become pregnant and children less than 8 years of age not to eat fish from lakes and ponds in state. These advisories are based upon sam-

plings taken from lakes and ponds to determine fish mercury levels. For example in Maine, about one-half the fish sample had mercury levels in excess of the recommended health limits of 0.43 ppm (parts per million) and of the 150 lakes studied, about had fish with mercury levels greater than 1.0 ppm, some even two to three times greater (2.0 - 3.0 ppm).

There is general agreement that this mercury contamination results from atmospheric deposition of mercury—most of which is emitted into the atmosphere by coal-fired power plants, municipal solid waste to energy plants, and medical waste incinerators, probably located in southern New England and New York State. This region-wide problem graphically illustrates the relationship between energy system air emissions and our forest and aquatic ecosystems.

Unfortunately, our forest ecosystems and the health of our residents may not be protected from air pollution by existing electrical energy system air pollution controls. National ambient air quality standards have been established for CO, SO<sub>2</sub>, NO<sub>2</sub>, ozone, and particulates. Recent research suggests that these standards are no longer effectively protecting either human health or the health of aquatic and terrestrial ecosystems.

The key concerns about such impacts relevant to the Northern Forest's are as follows:

1. Air emissions impacts are regional, not local. If air emissions create serious problems, they are more likely to have widely-diffused impacts compared with most other pollution problems—as the entire forest region could be impacted.

The recent fish mercury contamination health advisories illustrate how widespread such impacts are likely to be when they occur.

2. Air emissions impacts are often delayed as pollutants accumulate in ecosystems. Thus, a significant time lag (up to many decades) may occur between pollutant deposition and measurable impacts. This means that we may not know about critical forest system impacts until it is too late to correct the problem.

For example, recent research suggests that the large amount of lead deposited in the Northeast since about 1950 may emerge as a pulse of ground and surface water loading after a period of 80 to 100 years of transit through northeastern soil profiles.

3. Cumulative air pollution loading may in some cases exceed thresholds that change the nature of impacts such that new impacts suddenly appear that result from years of loading.

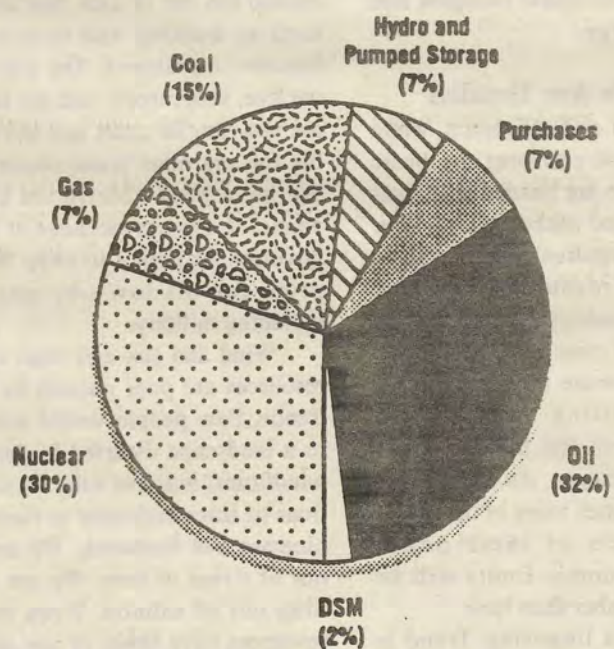
For example, several researchers have recently noted that cumulative nitrogen deposition to date in the northeast may be producing the first signs of a general eutrophication of traditionally nitrogen-limited forest ecosystems in the Northeast. When this point is reached, nitrate leaching through soils into ground and surface waters can be expected (as has been observed in studies of regional lakes subject to acidification) along with leaching of key plant nutrients (perhaps most importantly, calcium cations).

4. Air emissions impacts are highly complex and poorly understood. Research to date has tended to focus on single pollutants and impacts of immediate concern (for example, SO<sub>2</sub> and acid rain), rather than focusing on the synergistic effects of both near and long term impacts of all atmospheric air pollutants. In addition, atmospheric chemistry is complex and many air pollutants may interact with and alter one another in the atmosphere. Different air pollutants may also produce combined effects on forest systems that can not be attributed to the direct impacts of any

## New England Power System at a Turning Point

- o Excess capacity presently: approx. 3,000 MW out of 26,000 MW
- o But much of NE capacity fragile
  - nuclear
  - coal
  - older oil
  - Hydro Quebec contract expirations in 2000
- o Economic, electric demand growth resuming
- o Energy efficiency capability developed, but not fully deployed
- o Advanced renewables capability low at present
- o Pressures to deregulate retail system entirely
- o Eroding political support for environmental initiatives (e.g. efficiency, externalities).

## New England Electricity Mix—GWH (1991)



Source: NEPOOL 1991 Annual Report; New England Power Planning; NEPOOL Demand Side Management Committee.

Figure 1: New England's reliance on utility-sponsored energy efficiency and load management programs (DSM) is negligible compared to its reliance on conventional generating sources.



single pollutant.

### Meanwhile: Somewhere a New Plant Is Being Planned

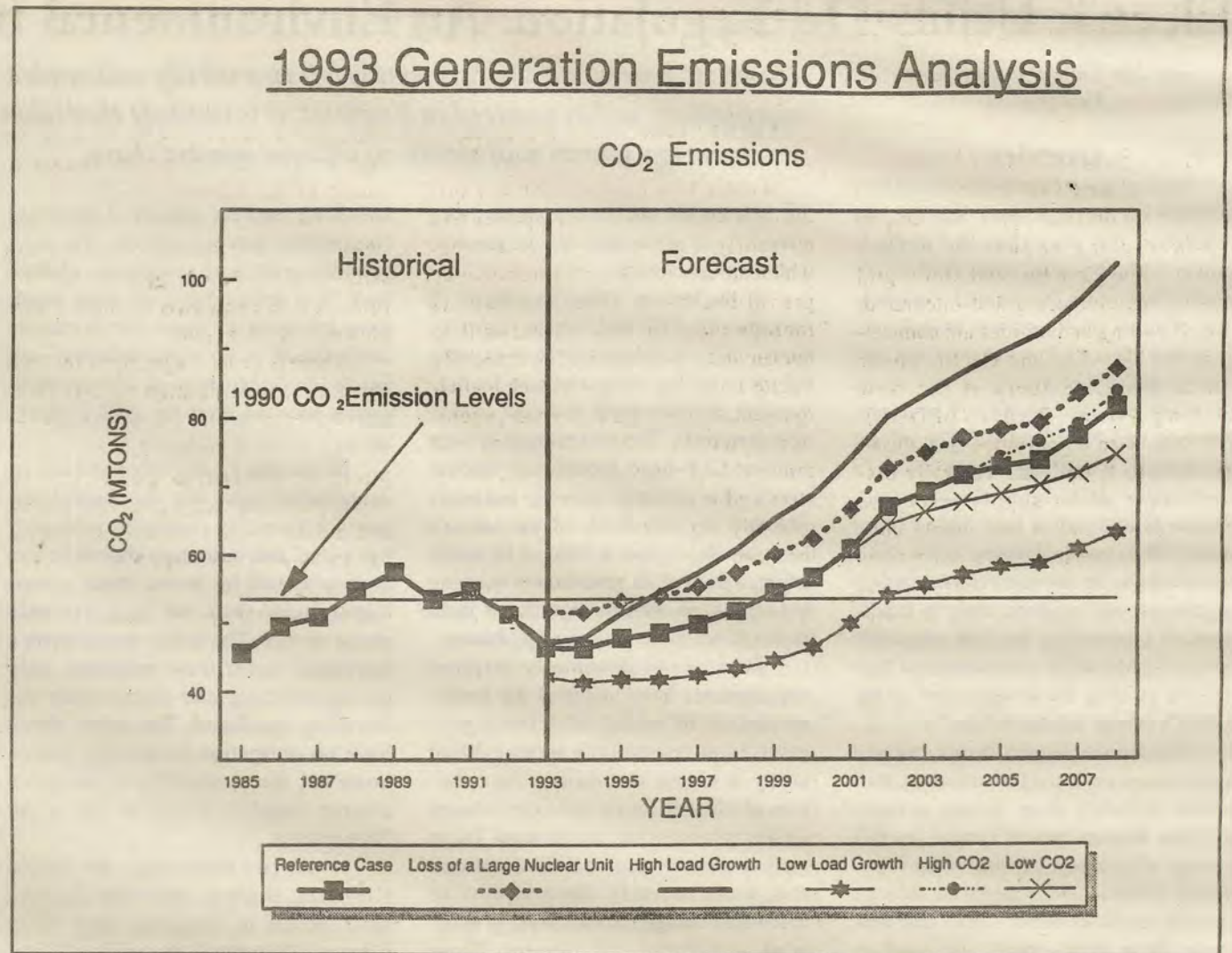
The current electrical generating surplus in New England is highly fragile. In particular, New England faces the prospect of early retirement of many of its nuclear plants and coal and oil plants, as well as the expiration of several hydroelectric contracts.

New England may need to construct a significant amount of generating capacity within the next decade. If all or most of this capacity is fossil-fuel based, the environmental consequences for the Northern Forest region are likely to be severe. If cleaner, renewable energy along with more DSM and conservation can be put into place as the region's power plants are retired and replaced, the Northern Forests and New England will benefit substantially.

Official projections show that the New England power pool will need new power supply capacity by the year 1998. It typically takes at least five years to plan for, site and build a new power plant in New England. Thus, action to meet new capacity needs should be initiated at least five years before the projected need for such capacity.

CLF believes that new power supply-side resources may well be needed earlier than this official date because much currently available capacity could be retired on an unscheduled basis well before currently scheduled retirement dates. We believe that such unscheduled retirements will probably be more important than growth in electrical demand in determining when new supply capacity will actually be needed. (see *Box on New England's Renewable Energy Resources*)

Mounting evidence suggests that New England may see a pattern of early retirement of at least several of the



region's nuclear power plants as these plants become uneconomic to continue to operate. A recent report from Wall Street analysts Shearson/Lehman predicted that roughly a quarter of the nation's 110 operating commercial nuclear plants would be retired within the next ten years due to economics. Many New England plants are likely to be included in this group as they are the oldest nuclear plants of any regional cluster in the nation.

If one assumes that the region's older nuclear plants are retired about ten

years early, this would create a currently unprojected demand for about 3600 megawatts of replacement capacity between 1997 and 2002.

The risk of incremental air emissions controls for coal units within New England also may result in pattern of early retirements towards the end of the decade. The most immediate risk to these units is the Phase II ozone smog attainment requirement contained in the federal Clean Air Act Amendments on 1990—which may be quite strict—but this is only one of several incremental

emissions control risks faced by these units.

Under some plausible scenarios, a large fraction of the region's coal units might have to shut down by the middle of the next decade (2005). This fragility is likely to require large investments in new supply to replace unscheduled retirements. This process could begin well before the end of this decade and possibly result in the loss of as much as 5600 MW, or roughly 25% of current NEPOOL installed generating capacity by the year 2005.

## New England's Renewable Energy Resources

### Wind

o **Resource Base:** Technical potential exists to develop several thousand megawatts of currently economic wind power technology in New England, generally at coastal and high elevation sites where winds contain the most energy.

o **Pollution/Waste Emissions:** No direct emissions, except for those associated with manufacturing wind power equipment.

o **Availability:** Typically wind power systems in New England will produce power during about 30% of the hours in any year. This is about one half the availability of typical fossil generation and about twice the availability of photo voltaic (PV) systems.

o **Land Use Impacts:** All impacts associated with moderate development, although life cycle impacts are light compared to a standard central power station (daily human traffic, scenic and auditory impacts). Avian impacts potentially significant depending on site.

### Biomass

o **Resource Base:** Incremental, sustainable New England biomass energy development potential is estimated to be as much as a couple of thousand megawatts. Most of this potential would be produced by replacing existing, in-efficient biomass power plants with advanced gasification and power conversion technologies.

o **Emissions/Waste:** Net CO<sub>2</sub> emissions vary by type of biomass feedstock as do other air pollutants. Emissions from conventional biomass power plants are generally comparable to those of natural gas plants. Fuel cells operated on bio-gas (land fill gas, sewage treatment digester gas and gasified biomass) have extremely low air emissions per unit of electrical output consisting only of CO<sub>2</sub> and trace amounts of NO<sub>x</sub>.

o **Efficiency:** Current biomass technology is relatively inefficient (30%); advanced biomass power technologies are much more efficient (for an extreme example, fuel cells operating on sewage digester gas can be up to 90% efficient).

o **Land Use Impacts:** Siting impacts are comparable to similar scale fossil facilities. Use of certain biomass feedstocks (for example, harvested biomass or biomass energy crops) can impact forest management practices and modify current land uses.

### Photo-Voltaic (PV) Power:

o **Resource Base:** The technical potential to develop PV power in New England is estimated to be up to several thousand megawatts. Currently PV power is far from economic, except in certain, high-value applications which are quite limited.

o **Pollution/Waste Emissions:** No direct emissions, except for those associated with manufacturing PV power equipment.

o **Availability:** Typically PV power systems in New England will produce power during about 17% of the hours in any year. This is about one half the availability of wind energy and about one-quarter that of typical fossil generation.

o **Land Use Impacts:** PV power systems require substantial area per unit of installed power or energy production. These requirements are somewhat mitigated as they are likely to be frequently installed on the roofs of buildings and eventually as a built-in element of building shells (siding, windows, etc.).

### Hydro

o **Resource Base:** Some potential exists to improve energy production at existing hydro facilities by improving their operational efficiency. This potential might be as much as several hundred megawatts of capacity.

There are new, unconventional hydro-power systems under development that might be able to economically produce energy at sites where conventional hydro technology cannot be economically developed or where the environmental impacts of traditional technology are unacceptable. No estimates have been made of how much energy might be produced within New England from such technologies, but such potentially is unlikely to exceed several hundred megawatts of capacity.

o **Emissions/Waste:** Hydro efficiency improvements and unconventional hydro development do not produce air emissions. New, large-scale hydro projects which produce new impoundments in Northeastern North America appear to produce significant greenhouse gas emissions (roughly equivalent to what would be produced by comparable sized natural gas power plants).

o **Land and Water Use Impacts:** Such impacts would generally be small from hydro efficiency upgrades and unconventional hydro. However, it is likely that water use impacts will constrain full development of the economic potential of this resource.

# Electric Utility De-Regulation: An Environmental Strategic Response

by The Conservation Law Foundation

## Overview

Recent governmental and utility actions in the U.S. and Europe are changing the way that the electric power industry may look five to ten years from now. Substantial deregulation of rates, utility service obligations, customer choice of power provider, and energy facility siting has already gone forward in the United Kingdom, Norway, and New Zealand. The advent of "retail wheeling" proposals in California, Michigan, Connecticut, Rhode Island and a half dozen other states has forced legislators, other elected officials, environmentalists, utility regulators, and utilities back to fundamentals concerning the role of public policy—particularly environmental policy—in guiding the development of the nation's energy infrastructure.

These de-regulatory trends, without a strong environmental overlay, will almost certainly blunt efforts to move the New England power system towards energy efficiency, cleaner fossil fuel power plants, and renewable energy sources such as wind, solar and biomass. These trends might also result in the greater use of cheap, coal-fired power plants, extended Hydro Quebec contracts and wide scale rate increases for residential and commercial electric customers.

Such a result is not inevitable, however. Much will hinge on how effectively environmental advocates are able to shape the restructuring process.

## Background—How Did We Get Here?

The U.S. electric power industry—like most of its counterparts throughout the world—is a highly regulated and centralized affair. Large private companies have been granted monopolies to serve customers in distinct service territories, are required to do so, and must

*If electric generation choice is simply left to a wholly unbounded marketplace, as has occurred in England, it is unlikely that clean energy sources will obtain significant market share.*

by law build sufficient generating capacity to serve demand at government-regulated rates.

In the last ten years, as a result of litigation by CLF and similar organizations, utility commissions have expanded these utility obligations to include broader environmental and cost control requirements. Environmental groups such as CLF have focused on utilities since the electric power industry accounts for two-thirds of the nation's acid rain deposition, a third of its ozone smog, a third of its greenhouse warming emissions, as well as significant local and regional toxic emissions problems.

These environmentally-inspired requirements have included the implementation of energy efficiency programs (now representing about 1-2% of utility revenues nationally); the selection of cleaner, more efficient smaller power plants over traditional large nuclear and oil- and coal-fired stations; and, more recently, the adoption of renewable energy sources such as solar, wind, geothermal, and biomass. These initiatives—many of which run contrary to traditional utility thinking—have been justified on the basis that electric power provision is planned and paid for on a centralized basis and therefore basic economic and environmental objectives for the system must be established and enforced on a centralized basis; otherwise, utility shareholder interests will prevail over consumer interests.

In the last decade, academics, utilities, and regulators have actively discussed a different, de-regulatory, approach that could conflict with the initiatives outlined above. Advances in power plant efficiency and smaller economies of scale; the availability of sophisticated electronic metering and

switching; and the impact of increased competition between utilities and independent generating companies spurred by a 1978 federal law—all these trends have led some to argue for expansive deregulation of the power industry—not unlike the deregulation of telecommunication services after the AT&T breakup.

In essence, the proponents of deregulation argue that the original reasons for the utility generating monopoly has ended, and customers should be free to shop around for power, much as customers now shop for long-distance phone service. The utility would retain a monopoly, under these proposals, only on transmitting and distributing the electricity purchased. The utility would have no obligation to provide power, however; the availability of adequate electric supplies would be left to the "free market."

In the last three years, the United Kingdom, Norway, and New Zealand have decided to reorganize their utility industry along these de-regulated lines; similar proposals are being studied and implemented in nearly two dozen other countries, including the United States. Initially in the U.S., this discussion has taken the more limited form of proposals for "retail wheeling." Under "retail wheeling," a retail electricity customer such as a large factory would be free to decline to purchase its power from its local utility's power plants and instead purchase power ("wheeled" or transmitted over the local utility's power lines) from a neighboring utility or an independent private generating company that just built a new plant independently of utilities. However, "retail wheeling" is only a limited form of deregulation: it would not eliminate the utility's legal obligation to serve customers (including

customers who choose to shop around for the moment and decide to return at a later time) with adequate supplies—the driver of much of the destructive power plant construction of the last two decades.

The economic and environmental consequences of this form of simplistic retail wheeling could well be significant for all concerned.

From the consumer side, retail wheeling may mean that large, sophisticated customers desert the utility system, leaving smaller commercial and residential customers to pick up the tab for the large nuclear power stations and other excess capacity projects built by utilities in the 1980's to meet demand; a recent analysis in Rhode Island suggested that remaining customers' rates might go up by as much as 43% in one year under a retail wheeling scenario.

From the environmental side, a number of negative consequences could occur:

\*Utility-sponsored energy efficiency programs might become more politically difficult to sustain. Today, investments in energy efficiency provide benefits to all customers by reducing system power demand, and can be spread around all customers, like the costs of a power plant. Under retail wheeling, a utility has less incentive to invest in efficiency in a factory that might not be served by the system for long; likewise, as such customers desert the system, efficiency investments are borne by the shrinking base of remaining customers, driving rates up.<sup>1</sup>

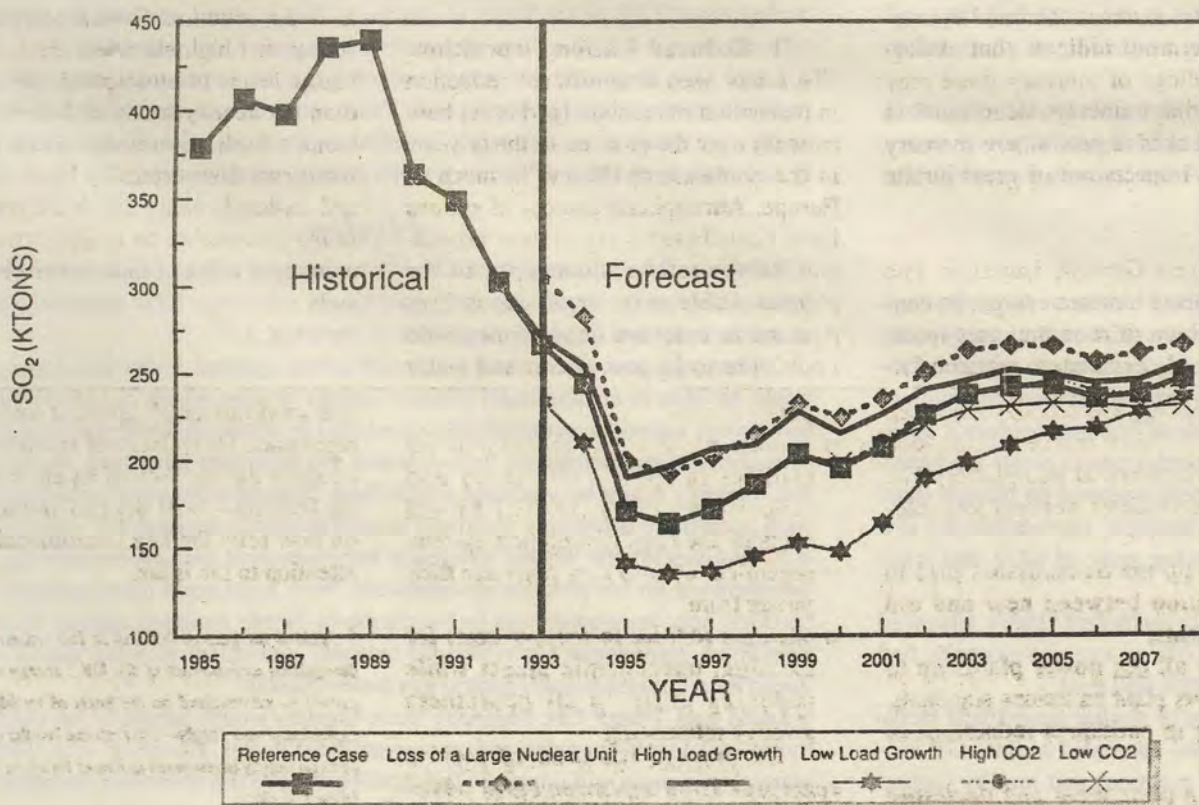
\*Cleaner fossil fuel and renewable energy plants will be more difficult to the extent they cost more than dirtier, existing plants. As with energy efficiency, some customers would be free to desert the system to escape these higher costs, leaving remaining customers with the bill. Under such a scenario, competitive pressures would discourage utilities from advancing cleaner plants and renewables.

\*Correspondingly, under a retail wheeling scenario, in which utilities must compete directly on price alone, the surviving utilities might be those with the dirtiest, oldest plants, no energy efficiency programs, and no renewable energy acquisition efforts. In one scenario, energy efficiency and renewable energy development in New England and California would come to a screeching halt, as customers within regions and between adjacent regions choose to be served by lower-cost fossil-fired power, increasing the amount of smog and greenhouse warming emissions. New England states which are presently violating federal clean air standards, and which are home to older coal plants, are likely to find their pollution problems worsened.

\*Presently, under most state laws, independent power plants may only be constructed if they are demonstrated to state authorities to be "needed." Under a retail wheeling scenario, however, the issue of "need" may become much more complicated, since a plant developer might argue that the potential existence of retail customers willing to buy the output of the plant meets the legal threshold of need. The result could be that vastly more power plants are built than is the case under the current regu-

## 1993 Generation Emissions Analysis

### SO<sub>2</sub> Emissions



# Environmental Linkages - New England's Energy System vs. the Northern Forest

In each of the following areas, recent research has raised concern within the forest science community about potential, significant forest impacts. Given the significance of these concerns and how little is yet known about air emissions impacts on the Northern Forest, these concerns suggest that air emissions impacts must be considered as a major (and perhaps the greatest) threat to Northern Forest resources.

**A. Nitrogen Deposition:** Significant deposition of nitrogen is occurring in the Northeast due to energy and transportation system emissions of NO<sub>x</sub>. Much of New England's forest area is nitrogen limited (as a plant nutrient). This means that these forests will use additional nitrogen deposited from the air to produce growth until nitrogen levels exceed plant and soil organism requirements. At this point these forests become nitrogen-saturated. Thus with no mechanism for plant uptake or microbial/soil retention, nitrogen begins to leave the system and thus leak, as nitrate into water bodies.

Nitrate leaching into regional lakes has recently been suggested to be offsetting the beneficial effects of reduced sulfur dioxide emissions on lakes sensitive to acidification, resulting in increased lake water acidification.

During nitrate leaching, base cations (particularly calcium and magnesium) are removed from the soil, increasing soil acidity and reducing the availability of critical nutrients.

Recent research in Europe suggests that leaching of calcium from calcium-poor forest soils (as a result of acid deposition) has negatively affected song-bird reproduction in these areas. A survey of several North American bird researchers conducted by CLF found that while similar reproduction impacts have not generally been observed in the Northeast, this European research raises serious questions about dietary calcium sources and potential soils calcium deficiency impacts on bird calcium uptake. Calcium deficiency-related reproduction impacts have been observed in some water birds breeding near acidified lakes in the Adirondacks and eastern Canada.

Nitrogen deposition also appears to increase soil greenhouse gas (NO<sub>2</sub>) emissions and may decrease soil uptake of methane, another important greenhouse gas.

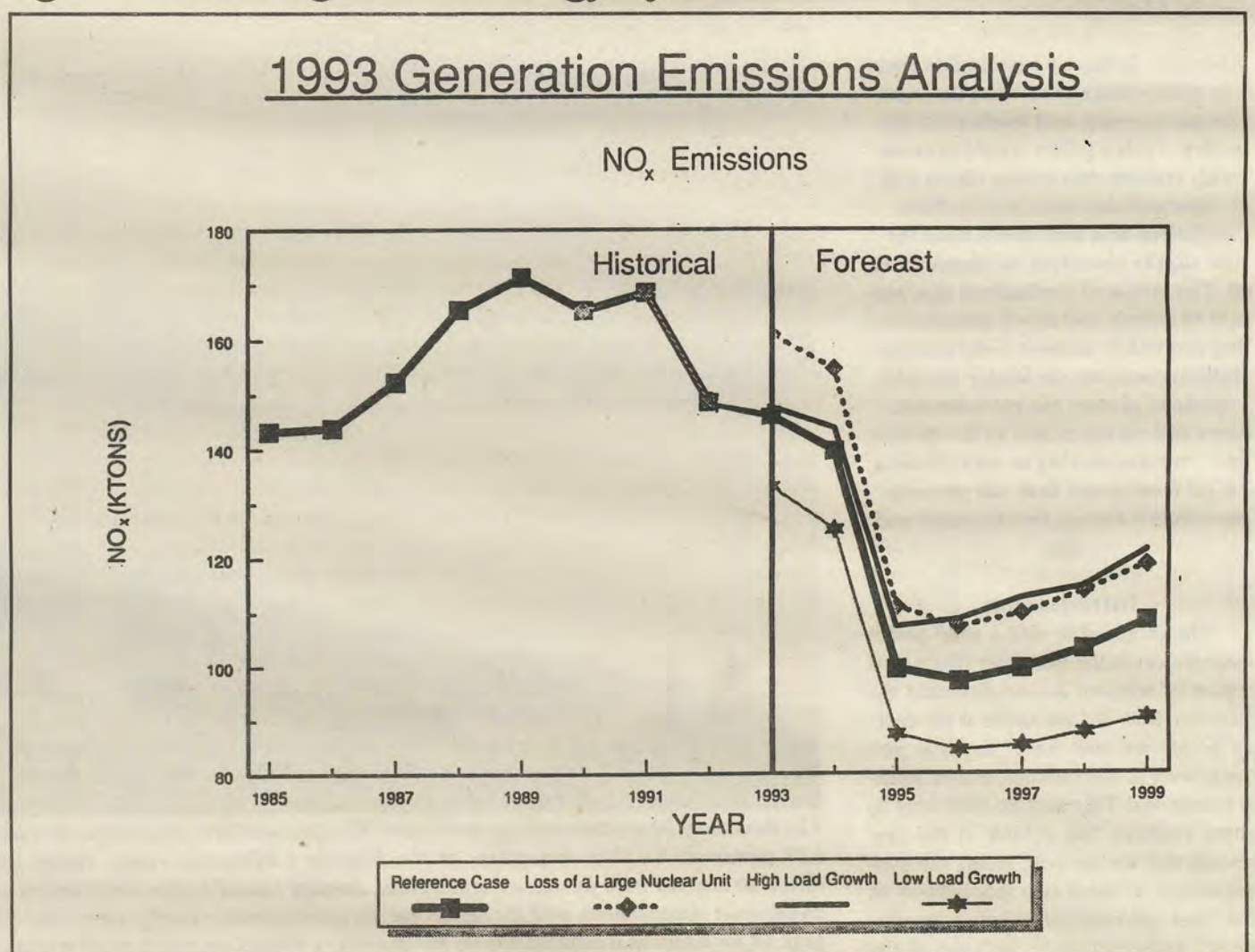
**B. Trace Metals Deposition-Cycling:** Many trace metals are emitted by New England coal and oil plants and municipal solid waste fueled power plants. These metals include mercury, selenium, arsenic, lead, and cadmium. Until recently, air deposition of these pollutants was resulting in steady accu-

latory regime.

## What Is to Be Done?

The stakes have never been higher for those who care about the environmental import of the region's and the nation's largest industrial polluter—the electricity system. If electric generation choice is simply left to a wholly unbounded marketplace, as has occurred in England, it is unlikely that clean energy sources will obtain significant market share.

Accordingly, CLF, along with sev-



mulation of these metals in forest soils.

The synergistic and long-term impacts on New England forests of continuing air deposition of heavy metals are not yet understood. The potential exists that such impacts may be found significant as research proceeds to examine them. The processes for ecosystem cycling of air-deposited heavy metals are just now beginning to be examined in New England.

Recent research on lead cycling in New England (the first of several planned heavy metal cycling studies) raises serious concern about potentially severe long-term impacts from lead deposition—particularly on ground and surface waters. To the extent that this work is confirmed and is characteristic of cycling processes for other air-deposited heavy metals, such "lagged" impacts may become of great concern to the region.

Preliminary data from a recently established study of atmospheric mercury and its impact on forested ecosystems in Vermont indicate that atmospheric loadings of mercury there may exceed loadings already documented in the Great Lakes region, where mercury deposition impacts are of great public concern.

**C. Forest Growth Impacts:** The Hubbard Brook research forest in central New Hampshire is the most intensively studied northeastern research for-

est. Net annual biomass growth at Hubbard Brook has recently dropped below zero, as a result of reductions in gross biomass growth below mortality. This decline in net biomass growth was not anticipated by scientists working at Hubbard Brook based on the age and other characteristics of this forest.

It is not known if the decline in growth observed at Hubbard Brook might be occurring elsewhere in the Northeast. While similar declines have not been observed at a research forest in Maine, no other forests in New England are being as closely monitored as those at Hubbard Brook.

Some researchers have suggested that reduced availability of soil calcium may be limiting growth at Hubbard Brook and that reduced availability of calcium may be resulting from the broadly observed decline of calcium cation deposition combined with increased leaching of calcium cations from soils due to nitrogen leaching.

**D. Reduced Cation Deposition:** There has been a significant reduction in deposition of calcium (and other base cations) over the past ten to thirty years in the northeastern US and in much of Europe. Atmospheric sources of cations have contributed a significant proportion of the total annual input to the plant-available reservoir of cations. This decline in calcium deposition could contribute to increased soil and water

acidification by reducing the pool of cations available to buffer acidic deposition. Decreases in these cations, perhaps in combination with increased nitrogen leaching, could ultimately deplete the reservoir of those cations most readily available to vegetation.

**E. Climate Change:** Greenhouse gas induced climate change could potentially have large forest impacts due to increased CO<sub>2</sub> availability, higher temperatures and changes in precipitation. These impacts would likely have complex effects on forest systems and are also likely to interact with other pollutants. The transitional nature of New England forest systems (Maine's forests lie at the northern boundary of the temperate forest and at the southern boundary of the boreal forest), could accentuate climate change impacts.

Fragile mountain areas, such as those which *The Northern Forest Forum* focuses on, are at special risk from air pollution. Several studies have shown that high elevation areas receive higher levels of atmospheric deposition than do nearby areas at lower elevations. High mountain areas in the Northeast also typically have shallow and un-fertile soils, which are generally more vulnerable to acidification and associated impacts than lower elevation soils.

—CLF

power system;

- o mandating ongoing investment by utilities in energy efficiency and renewable energy, funded by old users of the local distribution system, regardless of who they purchase their power from;
- o allowing utilities to recover costs for existing, uneconomic plants while reducing costs to all customers through refinancing.

The proposal has received positive reactions from environmental advocates, consumer advocates, many utili-

ties, environmental agencies and utility regulators. Its chances of success—particularly the viability of its environmental features—will depend importantly on how fully the key constituencies pay attention to the issue.

<sup>1</sup> This is the pattern that has in fact occurred in the deregulated environment of the UK: energy efficiency cannot be rationalized on the basis of avoiding more expensive power supply—since no one has the obligation to make supply investments in lieu of foregone efficiency in the first place.

# The Legal & Economic Obstacles to a Sustainable Energy Policy

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**Abstract:** To have a sustainable energy policy there must exist the legal means to create and implement this policy. Such a policy would presumably require that conservation and demand-side measures be fully exploited first and then a need for new supply resources be demonstrated. The laws and institutions that pertain to energy and development, having evolved to address compartmentalized concerns, no longer are adequate to protect the environment. Laws and recent trends in the electric industry are moving us away from a legal framework that will promote sustainable energy development and use.

## Introduction

The proposal to site a wind power megaproject in the Boundary Mountains region of western Maine provokes the question, how did we arrive at the energy policy we now have? In large part the answer is deregulation and economic incentives! This may be surprising to some readers, but a look at the law reveals that we are now seeing the consequences of these two touchstones of the "less government is better government" anti-regulatory rhetoric of the past decade and a half. And it appears more deregulation of the electric power industry is on its way.

The implications for Maine's North Woods are significant. It is a great region of renewable resources, including wood, water, wind and who knows what else. With government incentives to use renewable resources, it is only a matter of time before new technology and the free market come up with increasing numbers of proposals to utilize these resources for profit in the electric power industry. Earlier projects have included hydropower and biomass plants. The latest scheme is the Kenetech wind power project. Future projects using renewable energy resources in the North Woods could include: wood or peat burning plants, closed-loop biomass plants, hydropower, pumped storage facilities and large-scale wind and solar installations.

Keep in mind that renewable resources exist throughout the state of Maine and elsewhere. To energy developers, what is attractive about Maine's North Woods is the fact that few people live there and major portions of it are owned by a few large corporate landowners. This pattern of ownership and use creates an opportunity not available anywhere else. In the belief that the rejections of energy projects of the past were caused by local opposition and not by fundamental problems with the impacts or scale of the projects themselves, energy developers see the North Woods as the ideal site for a project that might attract significant attention and opposition in a more populous location. Increasing concern about insufficient protection of the North Woods is occurring at the same time as, and perhaps as a result of, pressures to "streamline" regulatory procedures and diminish standards of protection for natural resources. We should expect to see a rash of development initiatives as industries move to both create and take



*The Boundary Mountains looking north over Rangely and Mooselookmeguntic Lake. Kenetech Windpower wants to erect over 630 windmills on three mountains in the Boundary Mountain range. Many environmentalists believe that this proposal should be stopped both for the environmental damage caused by the development and because Maine has no policy regarding windpower development, and the region has no comprehensive energy policy. See *The Northern Forest Forum*, volume 2 # 6, page 14 for additional information on the Boundary Mountain windpower proposal. Photo by John McKeith.*

advantage of an anti-regulatory atmosphere, before opportunities to site projects on a first-come first-served basis disappear.

This article takes an initial look at some of the trends in regulation and deregulation in the electric power industry and analyzes some of the differences in the approaches used by various agencies of Maine government in addressing energy proposals. It is not comprehensive, but is meant to illustrate the premise that the framework we have now actually promotes wasteful and environmentally destructive energy development. It is meant to be a warning to those who would protect the North Woods: know as much about our laws as do those whose business is to exploit the North Woods.

## Two Crises—Environmental & Institutional

In 1987, the World Commission on Environment and Development, otherwise known as the Brundtland Commission after Dr. Gro Harlem Brundtland, then Prime Minister of Norway, issued a report in 1987 which made recommendations for dealing with the interlocking issues of environment and development. It was out of this report that "sustainable development" emerged as a major concept. "Sustainable global development requires that those who are more affluent adopt lifestyles within the planet's ecological means—in their use of energy, for example."<sup>1</sup> This message is not new. In spite of many such calls to action in past decades, much more remains that could be done with energy conservation. What is new is that utilities, regulators and environmental organizations in this country apparently have undercut the pursuit of energy conservation.<sup>2</sup>

Energy policy has been the subject of many studies and reports by commissions and organizations inside and out-

side of government in recent years. Most studies have tried to predict how much and what kind of energy we will need, how best to acquire it and what our priorities should be in doing so. Few, if any, have actually looked at the past and at what comprehensive and underlying changes in our legal system are needed to bring about a sustainable energy future.

Before considering further the implications of these reports and their recommendations, we need first to try to determine whether any energy policy that is formulated will be implemented given our present legal and policy framework surrounding energy and the environment. All of this discussion should take place in the context of a clear understanding of the history of our laws and institutions and the ways they currently function.

It is an ecological truism that energy generation, transmission and use profoundly affect the environment and people's lives. There is a direct link between the level and type of our energy consumption and the quality of our environment. Yet a close examination of our laws and institutions reveals that the legal means do not currently exist for creating sustainable energy development.

In the world of laws, nearly everything is compartmentalized, including the institutions within which regulation takes place. Developers are free to propose whatever energy projects they think can be licensed and profitable, but different reviewing bodies have different mandates and different criteria that proposals must meet. How a proposal will be reviewed, the level of scrutiny, and what standards have to be met, is determined by who is proposing the project and which agency reviews the proposal.

Regulators in our current system view energy development proposals by reducing them to smaller components—

for example, environmental, and economic—so that they can be evaluated by people with technical expertise in those areas. Because of gaps in our legal framework, one project may receive primarily an economic review, while another project receives primarily an environmental review.

In some states, the Public Utilities Commission (PUC) has a process for taking into account environmental externalities or costs, but this process may consider only certain costs. For example, in the analysis of new supply side resources, those sources producing carbon dioxide emissions may be penalized for such emissions, but those sources that cause significant land use impacts such as large scale hydroelectric, biomass and centralized wind power may not be penalized for their land use impacts. Maine's PUC does not consider environmental externalities.

Environmental impacts are typically reduced to smaller components to be analyzed and if possible, mitigated—effects on fragile soils, existence of endangered species, whether recreational uses would be affected, toxic emissions, etc. Yet broad-scale and long term problems, such as declining forest health, loss of biological diversity, fragmentation and cumulative impacts on wildlife populations and habitats, will not be adequately addressed when individual projects are examined.

Only projects requiring some federal action will be subject to a federally-mandated environmental impact statement (EIS) which requires looking at alternatives including the "no-build" alternatives. For example, a project involving a transmission line that crosses an international border requires an EIS before the federal Department of Energy will issue a Presidential Permit.

More examples of the reductionist approach can be seen in treatment of different components of the electric industry such as wheeling, generation,



Windmills in California's Tehachapies Wind Resource Area. Photo by Alex MacLean—Landslides.

energy conservation and renewables, where lawmakers have made changes here and there in an attempt to improve the delivery of the product and service. The problem with the common reductionist approach is that the components of the utility industry do not operate independently and in isolation of each other.

For example, competition introduced by wholesale and retail wheeling undercuts conservation efforts because if customers can switch suppliers at any time, suppliers will try to minimize rates in the short term. In order to minimize rates, utilities will need to promote conservation, increase sales, and maximize use of their facilities, not encourage conservation. Furthermore, since conservation cuts into volume-based profits, and bringing new renewable energy sources on line raises rates in the short term, utilities will avoid these alternatives. One option that has been discussed that would avoid this clash, and do so without opening the industry to the competition that also risks forcing some utilities into bankruptcy, includes linking a utility's profits to its success in minimizing the economic and environmental costs of electricity services. With deregulation of the electric industry, that option may not be available.

Even if there is agreement as to energy policy, the decision-making framework by which energy projects are licensed varies so greatly from agency to agency and project to project that it may be impossible to implement a sustainable energy policy without significant changes to the relevant institutions and laws. Only fragments of a sustainable energy policy have been established, resulting in major gaps in exist-

ing law related to the environment and energy development. Meanwhile, at an accelerating pace, changes in technology have caused energy development and its impacts to outdistance the laws that do exist. The analogy is that of a balloon. As incremental reforms are made to one side, the balloon bulges out the other side.

The longer we continue to delay before adequately dealing with the energy crisis, the more urgent it becomes to act. Without changes in the laws and institutions, the overall energy crisis will worsen and we will continue to react haphazardly to one crisis after another, one proposal after another. The Kenetech wind power project is just one illustration of our inadequate framework for properly dealing with energy developments and the environment. It should be clear that to adequately deal with the energy crisis, we first need to deal with our institutional crisis.

#### A Closer Look

What laws exist that work in favor of a sustainable energy future? There is one. Maine has, in statutory form, an Energy Policy Act. The problem is that it only applies to decisions that come before the Maine Public Utilities Commission (PUC) and only when the available alternatives are otherwise equivalent in terms of cost and risk. Only Maine electric utilities are regulated by the PUC. Title 35-A, § 3191 states:

*Energy Policy: The Legislature finds that it is in the best interests of the State to ensure that Maine and its electric utilities pursue a least-cost plan. The Legislature further finds that a least-cost plan takes into account many factors, including cost, risk,*

*diversity of supply and all available alternatives, including purchases of power from Canadian sources. When the available alternatives are otherwise equivalent, the commission shall give preference first to conservation and demand management, including interruptible capacity resources, and then to power purchased from qualifying facilities. Nothing in this section is intended to modify the commission's authority under section 3133, subsection 9.<sup>3</sup>*

Once again, recall that developers of energy projects may be regulated by different government agencies. Because public utilities are monopolies, the public, through government regulation at the PUC, has been able to establish rules by which public utilities are made to act in the public interest. That has been the trade-off for allowing utilities to be monopolies. At this time, as a consequence of changes in federal and state laws, the electric industry is in transition from being monopoly-dominated to being deregulated in a competitive marketplace.

The fact that Maine's Energy Policy Act applies only to Maine electric utilities' plans means that construction decisions made by non-utility power producers such as small power producers, and by large customers who may be able to opt out of the system by producing their own power or purchasing it from out of state producers or utilities, are made without consideration of Maine's Energy Policy Act.

Under current Maine laws, a Maine utility probably would not get approval to build a coal-burning power plant, but a private entity probably could. In fact, a coal-burning cogeneration electric

plant was built in Rumford, Maine, in the late 1980s, by the Boise Cascade paper mill. The power is sold wholesale to the electric utility.

Utilities must obtain from the PUC a Certificate of Public Convenience and Necessity for either construction of a major generating facility or transmission line (over 1000 kilowatts in size or transmission lines carrying over 100 kilovolts), or purchase of generating, energy or transmission capacity.<sup>4</sup> Generally, the major question is one of need. As required by the Maine Energy Policy Act quoted above, the proposed power purchase also has to be superior to the alternatives of conservation and demand management and power purchased from qualifying facilities. These are economic questions.

The history of the law on the PUC certificate of need for generating facilities illustrates how the electric power industry was more regulated in the past than it is today. In an earlier version, 35 MRSA § 13-A (1964), the findings of need required of the Commission were virtually the same. However, before 1977, this law applied to all "electric companies," defined in 35 MRSA § 15 (1964) as "every corporation or person, their lessees, trustees, receivers or trustees appointed by any court whatsoever, owning, controlling, operating or managing any electric plant for compensation within this state, except where electricity is generated on or distributed by the producer through private property alone solely for his own use or the use of his tenants and not for sale to others" (emphasis added). In other words, it would have applied to any commercial power producer, not just utilities.

Today, the requirement to obtain a certificate of need applies to electric utilities, but not to private interests producing their own power, nor to independent developers of small energy production facilities using renewable resources and cogeneration facilities.<sup>5</sup>

The independent power segment of the electric energy industry was deregulated over 15 years ago in order to promote energy self-reliance in response to the Arab oil embargo of the 1970s. The PUC does not consider whether the construction of an independent production facility will meet the PUC's criteria of need. Now it is the marketplace, and available tax incentives, that determine which projects are proposed. A change in our laws would be needed to require all electric energy development proposals to go through a review of need before a permit would issue.

Need obviously is a very complicated issue. The PUC law implicitly requires a utility to explore the alternatives, including conservation, thoroughly and to demonstrate the superiority of the utility's proposal, in a quasi-judicial setting, following the same rules of evidence that would apply in a court of law. For example, the mere existence of a contract for purchase of power is not adequate proof of need.

"Need" can be defined differently by different agencies. The Maine Department of Environmental Protection, which issues permits for projects in the organized municipalities, treats energy projects just like any other type of development and does not analyze whether there is a need for a project. As noted above, the PUC has relatively well-defined criteria and "need" at the PUC is more of a legal term than what the average person thinks of as "need." There must be findings that the facility is necessary and that the resource is part of the utility's overall least cost plan.

When the Maine Land Use Regulatory Commission (LURC) recently examined policy issues associated with rezoning and developing high mountain areas in unorganized townships for energy facilities driven by wind power, a discussion around the "need" criterion set forth in the LURC statute<sup>6</sup> raised many questions as to how need should be measured and evaluated. Some commissioners appeared to be at a total loss as to how need should be defined.<sup>7</sup>

This points to another difference between LURC and the PUC. LURC is made up of citizens living in or near Maine's unorganized townships, the PUC is a panel of professionals who typically have backgrounds either in finance or law. Legal and technical advice is more readily available to the PUC. In every case before the PUC, there is the involvement of an advocacy staff, which takes a position on the proposal that represents what is in the best interests of the entire state of Maine, not just consumer or utility. The Public Advocate represents consumers views before the PUC. LURC has no such advocacy staff or Public Advocate, and intervenors are perhaps intended to fill that role. But that works only if intervenors indeed become involved in the case and take meaningful positions. Furthermore, in order for there to be a public hearing, someone must request one, having somehow noticed the application. Someone must also have the



*An ill-advised proposal for a cargo port on Sears Island, Maine would enable Maine landowners to export woodchips. Currently, both New Hampshire and Maine public utilities are buying out the contracts of biomass plants so that the expensive energy contracts can be retired. Meanwhile, despite all the rhetoric about wood being a renewable energy source, forests are being liquidated by wood chip-pers. This photo shows the pristine and undeveloped eastern shore of Sears Island. Photographer John McKeith walked two hours without encountering another person.*

resources to develop a position in the case. In this sense, many decisions made by LURC are "discretionary." If no one opposes a project, then even if the decision was legally without basis, no one will appeal the decision to a court of law.

### Other Trends

With the deregulation of the electric industry, less of the electric industry is answerable to the public interest. While conservation is seen by the public as the best alternative to pursue first, conservation policy has very little teeth now. If need had to be demonstrated by showing that pursuit of conservation measures is inadequate to meet future demand, then conservation really would have to be pursued first, but that is not now generally the case.

Today conservation is not being pursued aggressively by utilities because there is a surplus of power in the region resulting from over-projections of need made by utilities during the 1980s. Because of the resulting glut of cheap power, utilities have renegotiated or otherwise bought out some power purchase contracts from small power producers. For example, in October 1994, Central Maine Power Co. purchased a Fort Fairfield, Maine, wood burning electric plant as part of this effort to get out of small power contracts. The biomass plant will run for at least three more years while CMP

attempts to reduce the plant's operating costs.

Some renewables nonetheless are being promoted. The federal Energy Policy Act of 1992 contains a provision for a production-type credit against income tax liability for electricity produced from either wind energy or "closed-loop biomass" facilities<sup>8</sup>. "Closed-loop" is defined in the statute as any organic material from a plant which is planted exclusively for purposes of being used at a qualified facility to produce electricity. The credit is 1.5 cents (adjusted for inflation) per kilowatt hour of electricity produced from those sources placed in service after December 31, 1993 (December 31, 1992 in the case of a closed-loop biomass facility) and before July 1, 1999. This is a general business credit available only for power sold to an unrelated customer.

The legislative history of the federal Energy Policy Act reveals that an important purpose of this tax incentive was to increase use of renewable energy because "[I]ncreased use of solar, wind, biomass, and geothermal energy will provide environmentally benign energy, create economic benefits and increase the security of energy supply."<sup>9</sup> However, it is questionable whether anyone would call the Kenetech megaproject, with its 37 turbine strings on 25.7 miles of high mountain ridges, 108 foot diameter blades, 100 foot wide

transmission right of way, clearings for roads, facilities and overhead connector lines on 1,442 acres "environmentally benign."

For another example of how this tax credit may be used, consider that although the Fort Fairfield plant just purchased by Central Maine Power Co is not a closed-loop facility at this time, it cannot be too far-fetched to imagine LURC considering a future application to plant and grow non-native vegetation with high fiber-producing potential on clearcut land to fuel the Fairfield plant, thus qualifying it as a closed-loop biomass plant for the tax credit.

In another development, the federal Energy Policy Act of 1992 allows states to decide whether or not to allow retail wheeling of electricity, or electricity shopping. Federal law already requires utilities to wheel power for wholesale producers. In summer 1994, the California PUC has issued an order that will allow retail wheeling to all large industrial customers starting on January 1, 1996. By the year 2002, even residential customers in California will be free to buy power from competing suppliers. Tactics are likely to be similar to those in the now deregulated telecommunications industry. An advertising analyst for Paine Webber has said that power companies will offer "bonuses for switching and incentives to stay," just like the telephone company. Obviously, advertising and self-promotion will result. It's not too hard to envision the possibilities if retail wheeling hits the eastern United States too—for example, "green power" generated from wood, water and wind resources in the North Woods could be in great demand by southern New England utilities.

There is a public power movement that promotes democratic control over the powerful electric industry. Maine law gives authority to municipalities to form such public power authorities. The federal Energy Policy Act of 1992 also makes it easier for local power authorities to wheel wholesale power from far away. However, public power companies are just as capable as private companies of massive environmental destruction. It remains to be seen whether municipal power authorities in Maine will implement meaningful conservation programs and sustainable energy policies, or whether they will just buy cheaper power from more polluting sources in order to obtain lower rates for their own customers.

### The Future

Current law affords some protections that are consistent with a rational and sustainable energy policy, but those protections are very limited and provide only a fragmented approach to the problem. We can probably expect to see these protections apply to few proposals in the future. While the PUC will have less and less oversight over the construction of new power plants, other agencies now will have a greater say in whether a particular energy project will be built.

Although it would be useful to come to an agreement on principles for establishing an energy policy, one unfortunate dilemma is that we seem to be more prone to reacting to crises than designing from the outset a real solution to the energy problem. As a consequence, our system of laws and policies has evolved in reaction to each crisis.

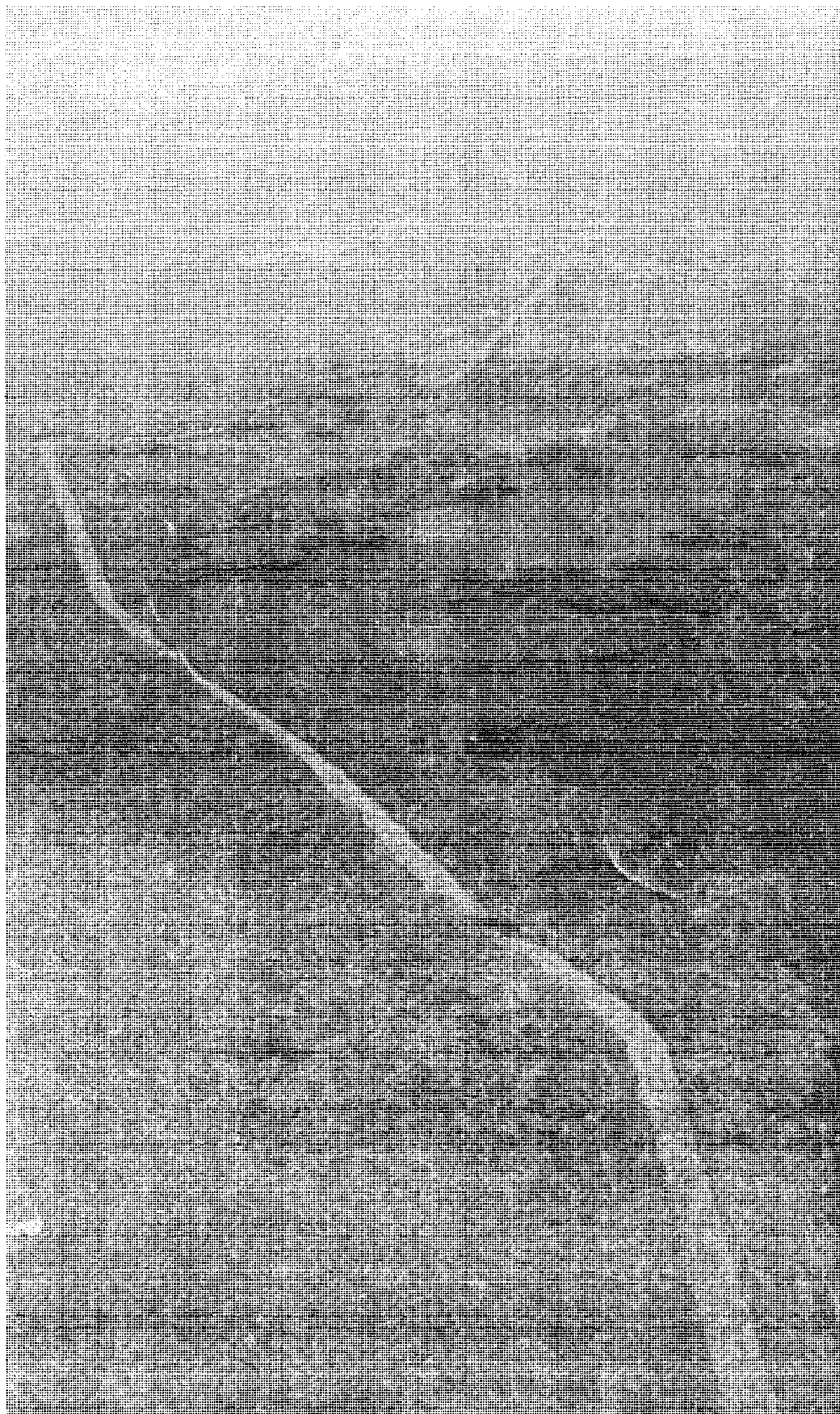
Equally problematic is that we don't react soon enough, and there is much to react to these days. This is particularly true with pollution and environmental harm. "We are accustomed to look at the gross and immediate effect and to ignore all else. Unless this appears promptly and in such obvious form that it cannot be ignored, we deny the existence of hazard."<sup>10</sup>

Should the marketplace continue to decide whether and which new power plants get proposed and built? Can we rely on the marketplace to make the best ecological decisions? Or should a comprehensive analysis be required that compares alternatives, including the no-build alternative, and looks at total costs to determine what is the best action to take? How is the analysis to be done? How will the environmental costs of energy sources that are harmful to the environment be incorporated into the economic costs? Should new development of renewable resources be contractually tied to retirement of more polluting resources? These and many more questions need to be asked, debated and answered as we seek to create a legal framework that will address our need for a sustainable energy future.

Although over three decades have passed since she wrote the following words in *Silent Spring*, Rachel Carson's query about our environment is still relevant as we contemplate an environmentally sustainable energy policy and the changes needed to make it a reality: *Have we fallen into a mesmerized state that makes us accept as inevitable that which is inferior or detrimental, as though having lost the will or the vision to demand that which is good?*

I hope there are many people with that vision, because we need it now just as much as ever before. In the long run, what's important is not whether we have now the laws to realize our vision, but whether we have the will.

Pamela Prodan is an attorney living in Wilton, Maine. She has an interest in energy issues as well as Northern Forest issues. She has participated in varying degrees in energy-related cases brought before the Maine Public Utilities Commission, the Maine Department of Environmental Protection and the Maine Land Use



Powerline corridor in western Maine. Powerlines are linear clearcuts that extend for miles. Herbicides are sprayed to kill undergrowth. Photo by Michael Kellett

Regulatory Commission. She won the 1992 National Energy Law and Policy Institute prize for her article, "The Legal Framework for Hydro-Quebec Imports."

#### Footnotes

<sup>1</sup> An Overview by the World Commission on Environment and Development, *From One Earth to*

*One World: An Overview by the World Commission on Environment and Development*, at 11 (1987) (Paper published by Oxford University Press).

<sup>2</sup> Doug Kessell, "Lack of Energy Conservation in Maine Decried," *Bangor Daily News*, October 29, 1994 (reporting that the Maine Public Advocate, Stephen Ward described the Maine law promoting conservation as having been dinged [sic] and subverted because of declining interest in conservation among power companies, regulators and residents. It also is noteworthy that while I was on a "tour" of the windpower project area, a representative of Kenetech assured me in no uncertain terms that electric utilities are now doing all the conservation they can do. I had asked for guarantees that an oil or coal plant would be shut down if the wind project were built and noted that windpower might actually displace conservation efforts instead, since building the project was not tied to the shut down of any existing facility).

<sup>3</sup> Subsection 9 states that the commission may consider the comparative economic impact on the State of production of additional power within the State, investments in energy conservation and the purchase of power from outside the State.

<sup>4</sup> 35-A MRSA §§ 3132, 3133.

<sup>5</sup> After the late 1970s, the commission no longer had any jurisdiction to consider the question of need when a power plant was proposed to be built by a non-utility. In *Bates Fabrics Inc., v. PUC*, 447 A.2d 1211 (1982), Maine's highest court decided that the Small Power Production Facilities and Cogeneration Facilities Act, a Maine law enacted in 1979, and the Public Utility Regulatory Policies Act of 1978, a federal law, excepted from regulation contracts for electrical purchases by a public utility from a cogenerator or small power producer.

<sup>6</sup> The basic criteria for approval of a change in the protection district encompassing high mountain areas is set forth in 12 M.R.S.A. § 685-A(8): "...substantial evidence that the change will satisfy a demonstrated need in the community or area and will have no undue adverse impact on existing uses or resources..."

<sup>7</sup> Discussion at LURC meeting in Bangor, November 17, 1994.

<sup>8</sup> 26 U.S.C. § 45(c)(2)

<sup>9</sup> H. Rep. No. 474(I), 102d Cong. 145, reprinted in 1992 U.S.C.A.N. 1968 (emphasis added).

<sup>10</sup> Rachel Carson, *Silent Spring*, p. 190.

## Photosynthesis

*Continued from page 7*

that plants can no longer adequately regulate in their role as "sinks" for carbon.

Nitrogen, the major limiting mineral resource for forest trees, is also recycled in its mineral form, but not completely, because water-soluble nitrogen compounds are lost through leaching and runoff. New atmospheric nitrogen must be added to forest ecosystems regularly through the action of specialized, nitrogen-fixing bacteria. To function, these bacteria require some of the stored chemical energy that is ultimately derived from photosynthesis. An important difference in the nitrogen-cycling ability of relatively undisturbed forests compared to clear-cut forests is the undisturbed forest's lower overall requirement for new nitrogen, partly due to a lower loss from runoff. Studies in New Hampshire have shown that the loss of nitrate-nitrogen is 10-50 times greater

on clearcut forests compared to undisturbed forests. Undisturbed forests do not necessarily support larger bacterial populations, but are able to use a large proportion of nitrogen that is converted into a useful form by the soil bacteria, thereby recycling this important mineral more efficiently.

Ultimately, the energy stored as chemical bonds in food and not yet lost as heat is passed to decomposers (fungi and bacteria). This is a crucial step in mineral cycling but the last step in the energy "cycle". All new metabolic energy must come from continual photosynthetic capture of solar radiation. Ninety percent of the standing biomass on earth today is in the form of trees, and together, the forests of the world hold an energy content that is equivalent to the total proven reserves of fossil fuel (including gas, oil, and coal)!

Greg Lowenberg is Professor of Biology at Middlebury College.

## The Book of Job's Environmental Message

McKibben, Bill *The Comforting Whirlwind: God, Job, and the Scale of Creation* Grand Rapids, Wm. B. Eerdmans Publishing Co. 1993. 95pp.

Noted environmental author and social critic Bill McKibben (an Adirondack neighbor to us at Vermont Natural Resources Council), looks to the Bible for a "new paradigm" in order to reverse the seemingly headlong rush in some quarters toward environmental destruction. It's to the Book of Job, and not the usually quoted Genesis he has turned to produce a deeply moving, thoughtful, and powerful call for human humility in Job's pattern.

"Humility first and foremost" is Job's reaction according to the author, and it should be ours as we have the admitted ability now to destroy—wipe out—innumerable other life-forms. It is no joy to McKibben, who is a young father, that when he was born he shared this planet "with perhaps thirty million other species" and when he dies "there may be one-tenth that number" (p.32). True joy may well come rather when we turn from destruction of so much around us, struggle with the orthodoxies of our day, as did Job (aren't our orthodoxies: "bigger is always better" and "growth is always good"?) and seek a deeper organic connection with God's creation, as did that grand old hero Job, who finally had his eyes opened.

*Comforting Whirlwind* is a great addition to a rapidly growing body of thought and writing in the religious world's connection to our natural environment and its care and stewardship.

—Reviewed by Bren Whittaker, Episcopal Minister, member of the now-defunct Northern Forest Lands Council, and VNRC's Northern Forest Project rep in the Northeast Kingdom.

### From *Comforting Whirlwind*

As I write these words, the 1992 presidential campaign is in full swing. The day after the Republican convention ended, President George Bush, speaking to a group of religious leaders, said that while the Democrats had a whole lot of words in their platform, nowhere did the word "G-O-D" appear. Not once. A president should believe in God, he continued.

A few weeks later, on an election-eering trip through Oregon, the president announced that he was going to try to open up more of the old-growth forest on federal lands to renewed logging. The logging had been halted to protect the habitat of the spotted owl, but President Bush was not, he said, going to let some "furry, feathered bird" get in the way of prosperity. In fact, he said he wouldn't extend the Endangered Species Act when it came up for renewal unless it was radically redrawn to prevent any serious economic impact.

Editorialists and commentators analyzed both positions at great length, but nowhere did I see anyone pointing out what to me is their fundamental contradiction. How can one believe deeply in God and yet be so cavalier about God's creation." (pages ix-x)

# Maine Audubon Offers Proposal for Protecting the Best of the Northern Forest

*Ed. Note: The following preliminary proposal is reprinted from Habitat: Journal of the Maine Audubon Society, vol. 11, #4, Fall 1994. MAS believes it represents a starting point for discussion about strategies to develop sustainable natural and human communities.*

## The Issue: A Resource at Stake

The largest tract of undeveloped land remaining in the eastern U.S. is right in our own backyard. Encompassing more than 15 million acres of northern and eastern Maine, it is an area of unparalleled significance for wildlife habitat, backcountry recreation, and forest resources. Various called the Maine Woods, the North Woods, or the Northern Forest, this region is the foundation for the ecology, economy, social character, and historical identity of much of New England.

But this legacy is vanishing. Piece by piece, the remote and still unspoiled nature of Maine's Northern Forest is disappearing. Each year new roads reach farther into these woods, opening up once largely wild areas. Increased timber cutting is fragmenting or destroying wildlife habitat. Ever greater numbers of people are crowding the rivers, trails, and campgrounds. Vacation homes are sprouting up along once-pristine lakeshores. And changes in global economies are eliminating once-stable jobs in local communities.

Change is an inherent part of any landscape, of course, especially one as large as the Northern Forest. Yet enough of the Northern Forest remains intact that we can still play a part in directing the change and thereby protect and enhance the core of what makes the region so special. Undeniably, it is a daunting challenge, but there is also much to work with, both in terms of the areas suitable for protection and in the different land conservation options available. What's more, the vast majority of the Northern Forest is owned by only 29 corporations, families, or individuals. Solutions are possible.

## The Emergence of a Plan

The need for a plan to protect the Northern Forest grabbed the public's attention in the late 1980s after several large tracts of timberland were put on the market for vacation-home development. With pressing immediacy these land sales revealed the Northern Forest for what it was: a finite resource subject to decisions made by interests mostly outside the region. Jobs, wildlife habitat, public access, recreation, and other public values that the forest had been providing for a century were suddenly vulnerable, and few mechanisms were in place to protect them.

Recognizing that the size and importance of the Northern Forest demanded a concerted, unified effort on the part of the conservation community, the Maine Audubon Society, Appalachian Mountain Club, and Audubon Society of New Hampshire undertook a three-year joint effort beginning in 1990 to inventory the physical, ecological, recreational, timber, and development features of the region. The completion of the inventory in 1993 provided the first and only detailed database showing the distribution of important resources across the region. With that in hand, work began on developing conservation strategies for the Northern Forest.

## Three Key Elements

During the past two years Maine Audubon has played a major role in a collaborative effort by the region's environmental organizations to develop a long-term Northern Forest conservation plan. As envisioned, that plan has three key elements:

1. To designate areas with concentrations of ecologically sensitive features or special recreational attributes as "conservation priority areas" (CPAs) where a broad array of public and private resource-protection strategies would be employed;
2. To surround each CPA with seminatural managed forest lands upon which enlightened ("new") forestry practices prevail;
3. To balance legitimate community and conservation needs by identifying areas best suited for channeled economic growth.

## Conservation Priority Areas

At the heart of Maine Audubon's plan are five proposed conservation priority areas: White Mountains, Western Mountains, Upper St. John River, Greater Baxter, and Downeast Lakes. Ranging in size from 300,000 to 800,000 acres, each of these areas contain a concentration of ecologically sensitive features and special recreation attributes that merit special attention for targeted conservation efforts.

The five proposed CPAs are the result of an extensive review and analysis of the inventory database by Maine Audubon. From this initial analysis emerged 12 clusters of townships with outstanding ecological attributes. MAS staff then assessed the status of the various resource features and their context within the landscape of each of the 12 areas and ranked each on the basis of open space (low road density and low levels of existing development), landscape diversity (the number and size of lakes, rivers, wetlands, mountains, and ecosystem types), and biological rarity (the occurrence and distribution of rare plants, animals, and natural communities). Staff then selected the five areas with the highest ranking in these categories and, using geographic information system (GIS) technology, plotted preliminary maps delineating the proposed CPAs.

Public land acquisitions from willing sellers would be an important part of establishing the CPAs, but the concept is flexible enough to accommodate an array of land management and conservation options within each area as well. For example, public acquisitions would likely be required to establish a state system of ecological reserves that could protect exemplary natural communities and other rare natural resources needing special management. Site-specific management agreements with willing landowners, however, could protect deer yards and selected habitats for rare and endangered plants and animals.

A conservation easement along major hiking, canoeing, or snowmobiling routes could ensure long-term recreational enjoyment of the prime trail systems in the area. Other sections with especially low road densities could be designated as important areas for maintaining open space and/or wildlands. These lands could be protected by purchasing development rights that allow the landowner to continue harvesting in a manner that does not compromise the most valuable ecological or recreational features and values of the area. Still other sections would be designated primarily as timber harvesting areas with the stipulation that they be managed on a certifiably sustainable basis. For the most part the CPA lands are uninhabited, but the many land conservation options available would allow the needs of existing residential and commercial developments to be accommodated.

## Managed Forest Lands

Surrounding the CPAs, managed forest lands would continue to dominate the Northern Forest landscape. These lands would provide the seminatural forest setting essential to maintaining the integrity of CPAs as intact ecosystems. As with the CPAs, lands especially suitable for forest management need to be mapped and identified. The ongoing challenge for the environmental community will be to make the case for enlightened forest practices on these lands in both biological and economic terms.

## Economic Growth Areas

Although the economic well-being of the human communities in and around the Northern Forest closely correlates with the environmental health of the forest itself, any successful conservation plan for the region must also incorporate community needs. The groundwork for establishing sustainable local economies will require researching forest-based economic growth opportunities for the region that capitalize on its existing infrastructure and workforce. Once these economic growth areas are identified, work can begin to encourage development.

## An Idea with Advantages

The concept of establishing several separate CPAs in the Northern Forest has several important advantages over other recent proposals to protect one large

contiguous area as a national park or similar designation. Most obvious is that it allows for the protection of many of the most ecologically sensitive and recreationally valuable areas throughout the Northern Forest and not just those in a given area. Second, it distributes the impacts of large-scale land protection among private interests and communities around the Northern Forest. As multiple-use areas, CPAs would still allow timber harvesting, hunting, and other traditional land uses. At the same time, no communities would have to undergo the near-total conversion to a tourist-based economy similar to that experienced in the Ellsworth/Dar Harbor area or virtually any other town located adjacent to a national park.

Perhaps the most compelling case for the CPA concept, however, is that it is flexible and proven. CPAs will be managed for a variety of resource values: ecosystem diversity, wildlife, recreation, and timber production. This type of proposed protection and man-

## FIVE AREAS CONSERVATION

### UPPER ST. JOHN RIVER ①

#### Physical Features

- 410,000 acres
- 110 miles of the St. John River's main stem
- 15 lakes with 37.7 miles of shoreline
- 0.26 miles of road/square mile

#### Flora and Fauna of Special Concern

- confirmed Canada lynx habitat
- 2 of only 7 known sites for the brook stickleback fish
- 11 sites for the endangered plant Furbish's lousewort

### WESTERN MOUNTAINS ②

#### Physical Features

- 461,500 acres
- 16 mountains over 3000 feet
- 90 lakes with 332.6 miles of shoreline
- 0.27 miles of road/square mile

#### Flora and Fauna of Special Concern

- 1 bald eagle nest site
- 2 great blue heron rookeries
- 8499 acres of deer wintering yards
- 16 endangered plant species
- 62 acres of arctic-alpine plant community
- 9 old-growth forest stands
- 182 wetlands over 10 acres (12,928 acres total)

#### Recreational Highlights

- 61 miles of hiking trails
- 48 miles of flatwater canoeing
- 40 miles of whitewater canoeing
- 26 miles of snowmobile trails
- 80 miles of groomed cross-country skiing trails
- extensive backcountry skiing
- 1 alpine ski resort
- 7 scenic waterfalls
- 38 outstanding fishing lakes
- 82 miles of river fishing
- 26 miles of scenic roads
- 48 backcountry campsites

### WHITE MOUNTAINS ③

#### Physical Features

- 325,000 acres (Maine and New Hampshire)
- 32 mountains over 3000 feet
- 8 lakes with 17.7 miles of shoreline
- 0.38 miles of road/square mile of area

#### Flora and Fauna of Special Concern

- 2 peregrine falcon nesting sites
- confirmed Canada lynx habitat
- 1 bald eagle wintering area
- Small-footed myotis bat hibernation site
- 2 great blue heron rookeries
- 1532 acres of deer wintering yards
- 73 rare plant species
- 8 rare natural community types, including 5 alpine

#### communities and 7 alpine/subalpine bogs

- 4 old-growth forest stands (769 acres total)
- 31 wetlands over 10 acres (1751 acres total)

#### Recreational Highlights

- 580 miles of hiking trails
- 1.5 miles of whitewater canoeing
- 9 miles of flatwater canoeing
- 39 miles of cross-country skiing trails
- 1 alpine ski resort
- 71 miles of snowmobile trunk trails
- 15 scenic waterfalls and gorges
- 7 outstanding fishing lakes
- 22 miles of river fishing
- 45 miles of scenic roads
- 5 campgrounds
- 309 shelter & hut campsites



agement is not novel to the woods of Maine; in fact, it is already being effectively applied on most Maine Bureau of Public Lands' sites. That general conservation model could be extended to serve a much larger area. What is novel is an attempt to transfer this type of protection and management to a landscape that is largely held in private ownership.

### Making Northern Forest Conservation a Reality

The CPA vision can become a reality. The first step will be to map each of the proposed CPAs in detail. With maps in hand, Maine Audubon will present the CPA concept to the people who live, work, use, and own land in the Northern Forest, as well as to the state agencies who manage land use in this region. Their feedback and advice on the most appropriate and workable conservation strategies, both private and public, will be vital. Ultimately, it is from this constituency that public policy and enabling legislation will emerge.

The very successful Maine Rivers Bill can provide

a model upon which to fashion a "Forest Bill" in the near future. After the state's rivers were inventoried and evaluated, state legislation clearly proscribed where protection would take place and where development could proceed. The legislation delivered strong protection for the state's most valuable river sections but also offered streamlined permitting procedures for use of river sections in designated development areas. A "Forest Bill" could likewise identify CPAs where protection efforts would be concentrated—as well as economic growth areas where barriers to development are reduced, permitting is streamlined, and sustainable forest-based development encouraged.

Funding is, of course, essential for land acquisition. To meet this need, Maine Audubon will work with other New England conservation groups to improve the federal Forest Legacy Program, which pays landowners for conservation easements. Another effort will seek federal legislation to redistribute Land and Water Conservation funds, now spent almost exclusively in the West, to meet the needs for more

public land in the Northeast.

At the state level, Maine Audubon will be looking for opportunities to provide funding for the Lands for Maine's Future Board (LMFB). The LMFB, established through a \$35-million bond referendum, has successfully protected many areas of recreational and ecological significance. In addition, the Sportsman's Alliance of Maine and Maine Audubon have teamed up to establish a Maine Outdoor Heritage Fund that would provide funds for a variety of wildlife habitat protection projects, including the purchase of exceptional wildlife habitats.

Approximately 95 percent of Maine's 15-million-acre Northern Forest is privately owned, yet the value of this land to the public and the future of Maine and the Northeast cannot be overestimated. The challenge, therefore, is to design a conservation plan that respects this pattern of private ownership but also secures the future of Maine's valuable forest lands and the public resources they provide.

## TO PROTECT: ON PRIORITY AREA HIGHLIGHTS

- 7938 acres of deer wintering yards
  - 5 rare natural communities
  - 2 old-growth forest sites (340 acres total)
  - 185 wetlands over 10 acres (9615 acres total)
- Recreational Highlights**
- 15 miles of whitewater canoeing
  - 116 miles of flatwater canoeing
  - 7 outstanding fishing lakes
  - 110.5 miles of river fishing
  - 21 miles of snowmobile trunk trails
  - 32 backcountry campsites

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- GREATER BAXTER ①**
- Physical Features**
- 821,000 acres
  - 13 mountains over 3000 feet
  - 184 lakes with 769.1 miles of shoreline
  - 0.18 miles road/square mile
- Flora and Fauna of Special Concern**
- 7 bald eagle nest sites
  - 2 sites for the rare northern bog lemming
  - only known site for the Katahdin Arctic butterfly
  - only recorded water pipit nesting site in Maine
  - 3 of only 10 sites for blueback char
  - 1 peregrine falcon nest site
  - 1 great blue heron rookery
  - 13,223 acres of deer wintering yards
- Recreational Highlights**
- 42 species of rare plants
  - rare arctic-alpine vegetation
  - 14 old-growth forest stands (5040 acres total)
  - 415 wetlands over 10 acres (21,384 acres total)
  - 280 miles of hiking trails
  - 59 miles of snowmobile trunk trails
  - extensive backcountry skiing
  - 41 miles of whitewater canoeing
  - 85 outstanding fishing lakes
  - 98.5 miles of fishing rivers
  - 12 scenic waterfalls and gorges
  - 65 miles of scenic roads
  - 6 campgrounds
  - 126 backcountry camp sites

- DOWNEAST LAKES ⑤**
- Physical Features**
- 784,000 acres
  - 88 lakes with 678.1 miles of shoreline
  - 0.31 miles of road/square mile of area
- Flora and Fauna of Special Concern**
- confirmed Canada lynx habitat
  - 22 bald eagle nest sites
  - 2 black tern nesting sites
  - 3216 acres of deer wintering yards
  - 7 rare plant species
  - 7 old-growth forest sites (124 acres total)
- Recreational Highlights**
- 651 wetlands over 10 acres (47,220 acres total)
  - 4.3 miles of hiking trails
  - 71 miles of flatwater canoeing
  - 76 miles of whitewater canoeing
  - 45 miles of snowmobile trunk trails
  - 51 outstanding fishing lakes
  - 113.5 miles of river fishing
  - 117 miles of scenic roads
  - 57 backcountry campsites

Map by Barbara Charry

# Land Conservation Options

## Options for Private Landowners

With 95 percent of Maine in private ownership, the future of many of the state's most important natural and recreation areas rests with individual landowners and not the public. Yet because many public values are inherent in private land, the pressure on landowners to bear the responsibility and costs for protecting those values is mounting. Fortunately there is an array of creative ways private woodland owners can protect their property's natural values without relinquishing their rights to use and profit from their land.

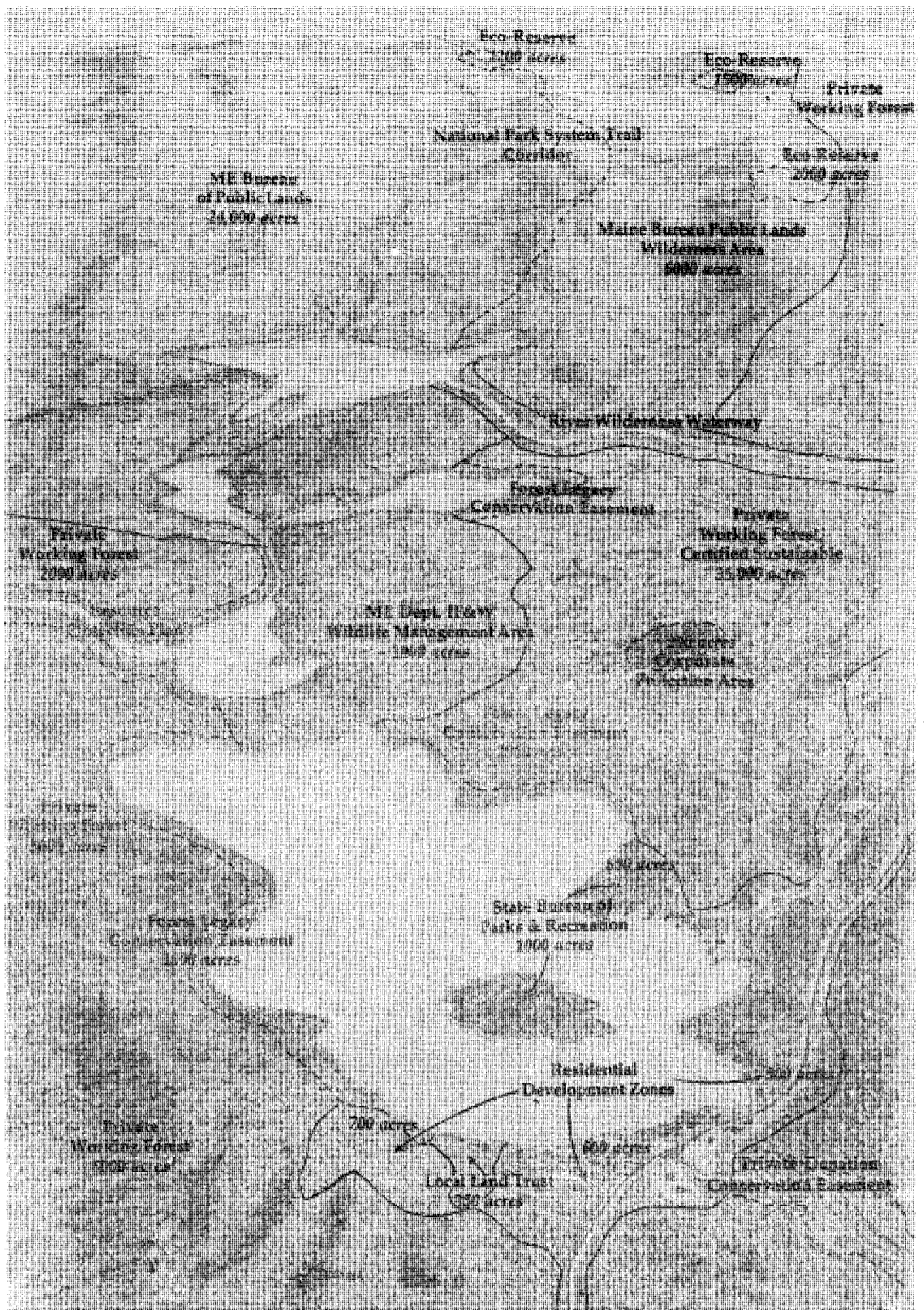
**Certified Timberlands.** Increasing demand from the buying public both in the U.S. and abroad for "green" products can be a major incentive for companies to use resources in ways that reduce or minimize harm to the environment. This is no less true for the wood-products industry, where timber "certified" as being harvested on a sustainable basis and under conditions sensitive to the environment is in high demand. Seven Islands Land Corporation is the first Maine company to receive international green certification for its timber products.

**Conservation Easements.** The popular option for many landowners who want to retain title to their land and want to protect its natural values in perpetuity is the conservation easement. This legal contract permanently restricts future development on a given parcel of land and is easily customized to match the needs of the individual landowner. If the easement offers public benefits, there are often substantial tax savings as well. Great Northern Paper Company, for example, donated easements prohibiting development along the East and West Branches of the Penobscot River to the state of Maine.

**Corporate Protection Initiatives.** Conservation is good for business, especially when it comes to generating positive public relations. One way corporate landowners have accomplished that is by developing their own inventory of special places and creating protection for them. A good example is Champion International Corporation's "Special Places in the Forest" program. Two areas protected under this program are a 100-year-old stand of red pine along the headwaters of the Machias River, and Holmes Falls for its waterfalls and historical importance during the log-driving days.

**Partnerships with User Groups and Conservation Organizations.** When intense or increasing public use of a private resource becomes a challenge for landowners, the creation of partnerships with user groups to manage access, litter, safety, and stewardship can provide a cost-efficient way of managing the situation. The Maine Island Trail Association, for instance, maintains recreational access to a network of public and private islands, helping owners of coastal islands with fire safety, litter and erosion control, and protection of fragile areas.

**Resource Protection Plans.** Landowners whose property lies within the Land Use Regulation Commission's jurisdiction (which includes most of Maine's Northern Forest) can negotiate resource protection plans that are detailed and specific for an area within their ownership. In these plans, recreation, wildlife habitat, public access, timber harvesting, and road building standards are all precisely defined, thereby greatly streamlining the land use permitting process. Typically the plan must be renegotiated after a specified period. Ten landowners along the St. John River have already negotiated such a resource protection plan for a ten-year period.



*Maine Audubon Society offers this drawing to illustrate possible land management designations on a hypothetical conservation priority area. Illustration by Bob Hooper*

## Strategies for Conserving Public Land

With Maine's economy tied to tourism and more than 70 million people within a day's drive, it is clear that land acquisition will be an important strategy in managing and protecting the Northern Forest's ecological and recreational values. This is particularly true for undeveloped lake and river shores where heavy or increasing public use is expected, specialized wildlife habitat that is not compatible with commercial forestry or unmanaged recreational use, and landscapes with outstanding natural features. There are several proven mechanisms for managing this land.

The Maine Bureau of Public Lands manages 485,000 acres for many uses, emphasizing the appropriate "dominant use" of a given area, whether it be for wildlife habitat, recreation, or timber harvesting. The Richardson Lake Management Unit in Northern Oxford County is one example.

This 23,000-acre parcel is managed for recreation in the areas near the lakeshores, and for commercial timber production in the extensive interior softwood stands.

**Wildlife Management Areas.** Maine's Department of Inland Fisheries and Wildlife manages 75,000 acres of public land for wildlife and its habitat. The Gordon Manuel Wildlife Management Area in Hodgdon, for example, is a nearly 6000-acre site with a variety of habitats including a deadwater with boat access, wetlands, upland forest, and agricultural fields managed for wildlife use.

**State Parks.** Except for 200,000-acre Baxter State Park, most of Maine's parks are small and primarily provide access to trail and water resources and/or providing amenities

for large numbers of day and overnight users. Park management is often the appropriate management tool to handle areas of high public use and demand, but without proper funding, increasing—or even maintaining—our state parks is a problem.

**Land Trusts and Nonprofit Conservation Holdings.** Although lands acquired by nonprofit organizations and trusts are not usually sizable, they often represent outstanding ecological or popular local landscape features. Donating or selling land to these nonprofit groups often relieves landowners' tax burdens and allows them to keep large parcels intact while continuing to have use of their land. The Rangeley Lakes Heritage Trust protects a large tract of land on Cupsuptic and Mooslookmeguntic Lakes, including shoreline, campsites, trails, and

mountains.

**Federal Lands.** Conservation land in Maine owned by the federal government is of three types: National Park, National Forest, and National Wildlife Refuge. National Parks—of which Acadia is one of the nation's most popular—are managed primarily for recreation and ecological values. National Forests are managed for a range of values, from designated wilderness to timber harvesting. The portion of White Mountain National Forest that spills over into Maine includes the 12,000-acre Caribou-Speckled Wilderness Area. National Wildlife Refuges are managed principally for their habitat values. The major management focus of Moosehorn National Wildlife Refuge in Calais is to provide habitat for American woodcock and ruffed grouse.

# Maine Audubon Society's Proposal—Deeply Flawed, But a Welcome Offering

by Jamie Sayen

Maine Audubon Society's (MAS) proposal for designing Conservation Priority Areas (CPAs) in the Maine Woods, "Defining Our Priorities," is a welcome, but profoundly flawed, contribution to the public discussion over the future of the region's forest ecosystems. MAS has shown the courage to define its terms and offer the Northern Forest community a concrete proposal to critique.

The rest of the environmental community should offer proposals of their own or endorse either the MAS proposal printed in this issue on pages 16-18, or the RESTORE: The North Woods proposal for a Maine Woods National Park (see *Forum*, vol 2, #6, pages 10-11), or the Thoreau Regional Wilderness Reserve proposed by Rudy Engholm and me (see *Forum*, vol. 2 #3, pages 4-5).

When evaluating proposals for wildlands reserves, we must ask if the proposal meets the four criteria outlined by Reed Noss in "The Wildlands Project: Land Conservation Strategy" in (The Wildlands Project Special Issue of *Wild Earth*, January 1993, page 11):

- 1) Represent, in a system of protected areas, all native ecosystem types and seral stages across their natural range of variation.
- 2) Maintain viable populations of all native species in natural patterns of abundance and distribution.
- 3) Maintain ecological and evolutionary processes, such as disturbance regimes, hydrological processes, nutrient cycles, and biotic interactions, including predation.
- 4) Design and manage the system to be responsive to short-term and long-term environmental change and to maintain the evolutionary potential of lineages.

The MAS proposal may: (1) protect some—but not all—native ecosystem types and seral states; and (2) maintain viable populations of some—but not all—native species in natural patterns of abundance and distribution. It is unlikely to adequately maintain ecological and evolutionary processes, nor is it likely to be sufficiently responsive to short and long-term environmental change, nor to maintain the evolutionary potential of lineages.

In short, the CPAs identified by MAS contain many of the pieces necessary to achieve the goals articulated by Noss, but there are huge gaps and MAS's proposal for managing the CPAs it has selected undercuts, rather than promotes, the protection of regional biotic integrity.

**Flawed Inventory:** MAS cites "An Inventory and Ranking of the Key Resources of the Northern Forest Lands of Vermont, New Hampshire and Maine" (hereafter cited as "Resource Inventory" or RI) as its "database" for developing its proposal. While the RI contains some important information, it is a limited and deeply flawed study that offers scant guidance in meeting the four criteria listed by Noss. (See an in-depth critique of the RI on page 20)

**Conservation Priority Areas:** The generally accepted model for ecological reserve design is a network of core



Checkerboard Clearcuts in northern Maine. Restoring the ecological integrity to this fragmented landscape will require the establishment of large core wildlands reserves on publicly owned land and an end to unsustainable forest practices on all private lands. Photo by Michael Kellett

reserve areas that are buffered from development and intensive forest management and connected with other cores. The core reserves are essentially wilderness. (See Noss, *Op., Cit.*, pages 10-25)

There is general agreement among the groups belonging to the Northern Forest Alliance that within the core wildland areas, large portions must be purchased by the public and managed as wilderness. No forestry or development will be permitted. Buffer zones around the core areas can be a mix of public and private ownership. Development will not be permitted in the buffer zones. Low-impact forestry can be conducted, provided it follows stringent ecological guidelines that help protect the ecological integrity of the entire area. In short, the number one priority for core wildlands areas is the protection of biotic integrity; other human activities will be permitted only insofar as they do not compromise the region's biotic integrity.

MAS defines its CPAs as "multiple use areas" that would permit timber harvesting and "other traditional land uses." MAS suggests that a "broad array of public and private resource-protection strategies would be employed," and its conceptual map of a "hypothetical CPA" shows that in a sea of private working forest, the CPAs would have small Maine Bureau of Public Lands holdings managed for timber and even smaller ecological reserves of perhaps 1000-2000 acres. It even contains "residential development zones."

MAS's concept of a CPA more closely resembles a strategy for a buffer zone (although buffer zones should not permit "residential development zones"). In effect, MAS has eliminated the most important component of a reserve strategy—the Core wildlands—and renames the buffer zone a CPA.

MAS says its CPAs are a concept that is "flexible and proven." Actually, the MAS approach represents a modest modification of the status quo in much

of the region—not a new approach to the region's ecological crisis. As designed, the MAS CPAs will not protect the region's biotic integrity.

**Reserve Size:** The hypothetical map provided by MAS suggests that eco-reserves could be very, very small—1,000-2,000 acres. This opinion is not shared by conservation biologists, most of the region's environmental groups, or much of the public that testified at NFLC Listening Sessions last spring. If we are going to restore and protect the integrity of the region's biotic communities, if we are going to have a chance to restore wolves, cougars, wolverines, lynx, and caribou, core wildland areas must be much larger. A few reserves in Maine must greatly exceed the size of 200,000-acre Baxter State Park.

The quality of wildness cannot be restored by postage stamp eco-reserves.

**Selection of CPAs:** Other groups that have utilized the information in the Resource Inventory have sought to compensate for its deficiencies by overlaying watershed level information on the Inventory data. MAS appears to have ignored the watershed level information:

\*Uplands crucial to the protection of the upper St. John River have been omitted;

\*Half of the Machias River Watershed and all the Narraguagus River watershed—the least developed portion of the Downeast Lakes region—have been excluded by MAS;

\*The proposed CPA for the White Mountain area excludes the most remote portions of the Upper Androscoggin Valley, and instead includes the most densely populated part of Coos County, NH;

\*The Boundary Mountains—site of a controversial proposal for windpower development supported by MAS, Conservation Law Foundation, Natural Resources of Maine, but opposed by almost every other environmental group and even some property rights advo-

cates—has been excluded from the Western Mountains area.

#### Funding Land Acquisition:

According to MAS, sources for funding are the tiny federal Forest Legacy Program that might net a state like Maine \$1-2 million a year, mostly for easements; a reinvigorated Land and Water Conservation Fund which could provide the region with hundreds of millions of dollars from the federal treasury in the next couple of decades if federal agencies play a role in land management. But, even the new Republican-controlled Congress is unlikely to simply throw money at the states with no strings attached. The only other sources of funding come from the State: the now unfunded Land for Maine's Future and a proposed lottery that will not net significant funds for wilderness acquisition.

**Forest Practices:** The section on "Managed Forest Lands" is confusing. There doesn't seem to be much difference between the managed forest lands inside MAS's proposed CPAs and the managed forest lands outside the CPAs. Apparently, logging will continue to dominate both categories. MAS does not tell us how we are going to assure "enlightened forest practices." It does not mention regulation of unsustainable practices. Worse, it places the burden of proof on environmentalists to "make the case for enlightened forest practices on these lands on both biological and economic terms." Isn't it time MAS and all responsible citizens and advocates insist the burden of proof rest with those whose proposed actions might have adverse biological impacts? The unexamined assumption of MAS's argument is that owners are entitled to continue to trash their lands until we can make the case for responsible, sustainable management.

**Easements:** Conservation easements can play an important role in buffering core wildlands areas and pro

*Continued on page 20*

# The 'Resource Inventory' Lacks an Ecosystem Perspective

"We do not suggest that this inventory in any way defines or describes the biological diversity of the study region."

"Data on the occurrences of rare plants, rare natural communities, and rare animals in the study region are notably incomplete because not all of the Northern Forest lands have been adequately inventoried."

"We realize that information gaps affect our evaluation of these resources..."

—Sally Stockwell & Barbara Charry, *Maine Audubon Society*, in "An Inventory and Ranking of the Key Resources of the Northern Forest Lands of Vermont, New Hampshire, and Maine" by Appalachian Mountain Club, Audubon Society of New Hampshire, and Maine Audubon Society, September 1993, page 21

In "Defining Our Terms: Maine Audubon Society's Proposal for Protecting the Best of the Northern Forest," we read: "The completion of the inventory [of physical, ecological, recreational, timber and development features] provided the first and only detailed database showing the distribution of important resources across the region." Since MAS cites no other study, we must assume that it relied heavily—perhaps exclusively—on this Resource Inventory (RI). In evaluating the MAS proposal, therefore, a careful analysis of the RI is appropriate.

There are serious shortcomings with this Inventory, as the authors of the chapter on "Ecological Resources"—Sally Stockwell and Barbara Charry—acknowledge. Yet, it appears that MAS overlooked these weaknesses when designing its proposal. Among the most serious shortcomings of the Ecological Resources chapter are:

**The Rating System:** Points were assigned to townships if they contained: known populations of rare plants, animals or natural communities; deer wintering yards; old growth; wetlands; or low road density. Any "point system" is necessarily arbitrary and unscientific. How do you quantify (assign points) to such qualities as wildness, remoteness, integrity, potential for restoration?

The RI's point system produced widely divergent point totals so that NH-VT scored dramatically higher than Maine. Stockwell and Charry admit: "This result is in part a reflection of varying level of inventory of rare plants, rare natural areas and rare animals among the three states." (p. 28) To compensate for this problem they arbitrarily selected different cut-off points for NH-VT and for Maine. It is extremely dubious that this sort of rating system could

pass any sort of scientific peer review.

**Lacks Ecosystem Perspective:** Points are only awarded for existing data, and there are significant information gaps, especially in Maine. Most of the data is "point data"—location of old growth or rare species—and lacks an ecosystem perspective. Accordingly, the inventory is useful in locating specific sites requiring protection, but is of scant value in designing a reserve system that seeks to protect ecosystems and processes such as disturbance and natural succession. Over-reliance on this sort of inventory promotes a continuation of failed conservation strategies that protect small isolated fragments rather than the larger reserves favored by most conservation biologists.

**Omissions:** While most of the categories rated by the Inventory are important, many other essential categories were not included in the ratings. Omissions include: extirpated native species such as wolves, cougars, wolverines, lynx and caribou; population centers of large wide-ranging species; representative samples of all major ecosystems and all seral stages within each type; centers of biologic richness and endemism (not just centers of rarity).

**Incomplete Inventories:** As Stockwell and Charry acknowledge, data on rare plants, animals and natural communities are "notably incomplete" because large portions of the region have not yet been adequately inventoried. Only about a quarter of Maine has

been inventoried for rare plants, yet the Inventory went ahead and assigned points for areas providing habitat to rare, threatened and endangered species. Areas without rare, threatened and endangered species received zero points. So did the three-quarters of the state that has not been inventoried. Since low point totals were used to eliminate areas from proposed CPAs, uninventoried areas were treated as though they had been inventoried and were without rare, threatened and endangered species.

Given the magnitude of the incomplete inventories, the only conclusion to be drawn from available data is: we have identified some areas known to possess rare, threatened and endangered species and natural areas. Until adequately inventoried from an ecosystem perspective, all other areas must remain as candidates for protection. Unfortunately, MAS has eliminated these uninventoried areas (unless they scored high in other categories).

**Extirpated Species:** The inventory does not include data on the habitat and range of extirpated species, especially large, wide-ranging predators such as wolf, wolverine, cougar and lynx. This biases the results of the inventory against restoration and against large wildlands areas and condemns us to accept current levels of ecological impoverishment. Thus, over-reliance on the Inventory produces old-style conservation strategies that preserve a few museum pieces, instead of the strategy

of today's conservation biologists who generally agree that large reserves are more likely to be richer in species diversity and biotic integrity than small, isolated reserves such as the 1,200-2,000 acre reserves proposed by MAS.

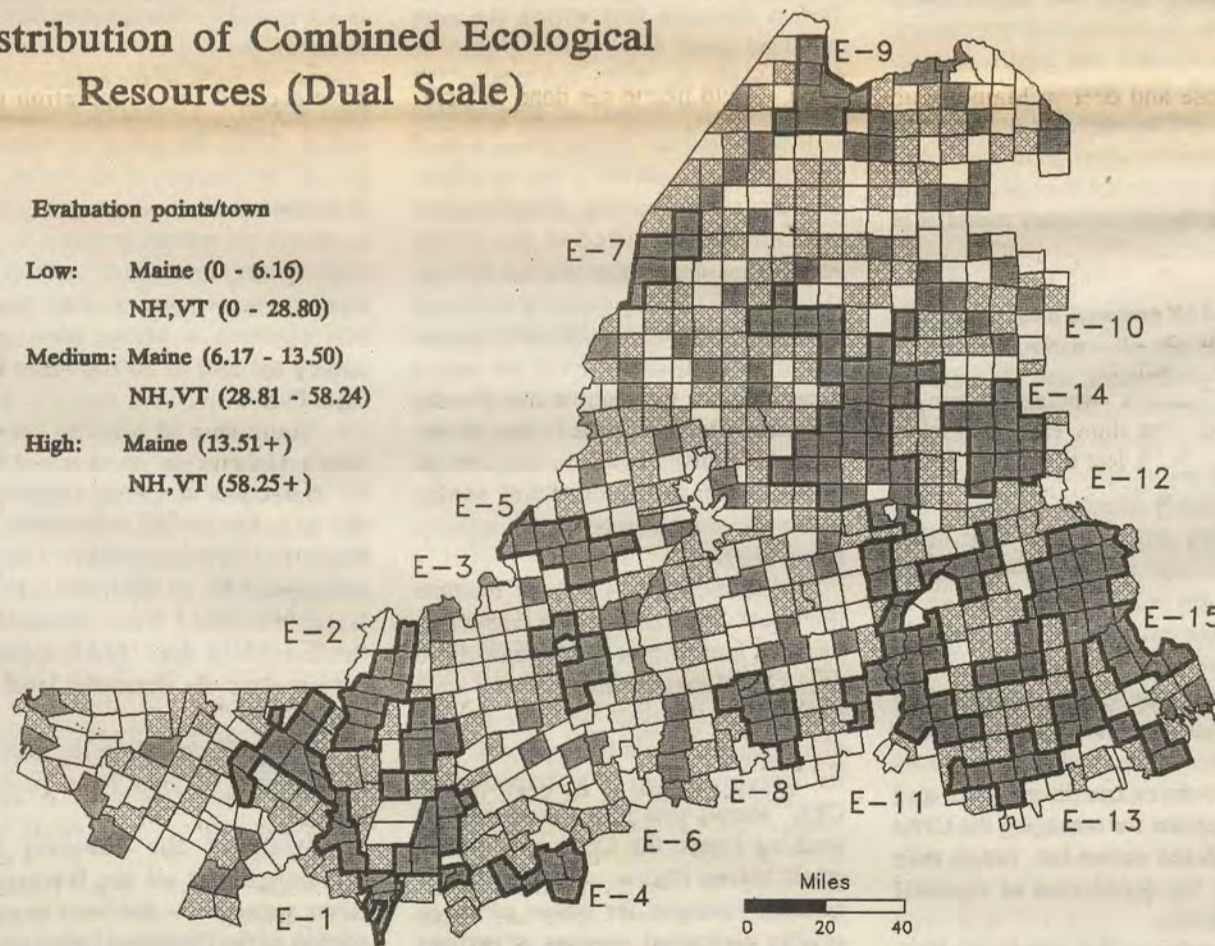
**Inventory Inaccuracies:** An inventory of such a large area invariably overlooks important details. When the Randolph, Conservation Commission produced "A Natural Features Inventory of Randolph, NH," it discovered several significant errors in the RI. Whereas the RI stated Randolph had no rivers or waterfalls, there are actually three rivers, ten named brooks and several named waterfalls. The RI said there were no rare natural communities or old growth stands, whereas Randolph possesses three rare natural communities and one old growth stand. The RI reported no rare animals and no wetlands are found in Randolph; in fact there are two rare animals and one wetland greater than ten acres.

**MAS Deleted Areas Identified by the Inventory as Significant:** The accompanying map, from page 37 of the RI, shows the areas deemed most ecologically significant by the RI. For reasons unexplained by MAS, areas E-4, E-8, E-11, E-13 and E-14 are not included in MAS's proposal. These areas are nearer developed areas, and hence may run into more anti-environmental hostility, but they are all the more important as refugia of biodiversity in a developed landscape.

—Jamie Sayen

## Distribution of Combined Ecological Resources (Dual Scale)

Evaluation points/town	
□	<b>Low:</b> Maine (0 - 6.16) NH, VT (0 - 28.80)
▨	<b>Medium:</b> Maine (6.17 - 13.50) NH, VT (28.81 - 58.24)
■	<b>High:</b> Maine (13.51+) NH, VT (58.25+)



## Flawed, But Welcome

Continued from page 19

protecting recreation corridors, especially if the easement is donated. Purchased easements often cost 50-90% of full fee purchase price, yet permit the landowner to clearcut, build logging roads, and spray herbicides. Easements are an expensive and ineffective way to protect core wildland areas. Limited acquisition funds, in general, are better spent acquiring full fee ownership of land.

**Green Certification:** If properly conducted, a pro-

gram that reliably certifies the sustainable management practices of a landowner can be of value in protecting timberlands and promoting more responsible consumer habits. MAS, unfortunately, touts the recent, highly controversial "certification" purchased by Seven Islands as an example. Yet, despite granting Seven Islands certification, Scientific Certification Systems found that Seven Islands' harvesting exceeds the calculated allowable harvest, causes widespread conversion to low-value, unnatural forest communities, applies silvicultural guidelines inconsistently, causes a decrease in biodiversity, lacks a formal wildlife plan and cuts

too close to streams for optimal sediment filtering. In addition, Seven Islands is the largest exporter of raw logs—and value-added jobs—from Maine.

**Conclusion:** The MAS proposal is little more than a modest reform of the status quo, and it will not preserve and restore the region's biotic integrity. Nevertheless, it is a welcome entry in the debate over the future of the Maine woods. It helps clarify many issues, and it certainly will provoke discussion. Debate and discussion can lead us to the policies necessary to assure sustainable natural and human communities in the region. Silence is the real enemy.

# Grassroots Coalition Promotes Wolf Restoration in Maine

by Fife Hubbard

A new organization dedicated to restoring wolves to Maine has emerged in the state's capitol. The Maine Wolf Coalition (MWC), a grassroots group founded by John Glowa of South China, Maine, supports wolf recovery through research, education and protection. The Maine Wolf Coalition is positioned to fill a vital niche in the public policy debate over whether wolves will be welcomed by Mainers to return to their native forests.

The cornerstone of the MWC program is contained in its first newsletter: "... regardless of whether one supports or opposes wolf recovery, it is of the utmost importance that the public be involved in the decision making process and be kept informed in order that decisions that form public policy be based upon facts, not upon unfounded rumors, assumptions, innuendoes, fears or political biases."

"Wolf Facts", a section of the organization's newsletter summarizes some of what has been learned about the status of the wolf in the northeast, restoration possibilities, and what the presence of wolves could mean to the people of Maine. Here are some excerpts:

\*In August of 1993 a two year old female wolf was shot in Russell Pond Township, ME, indicating that wolves are presently ranging through Maine searching for acceptable breeding territory.

\*Breeding populations of wolves exist to the North and East of Quebec City (75 miles from the Maine border).

\*Wolves have been known to disperse over 500 miles from their former pack's territory.

\*Wolves feed primarily on ungulates (moose and deer in Maine) with beaver being favored prey during times of open water.

\*This year's pre-season ungulate population in Maine was estimated at 300,000 animals. Recent year's records of reported kills during hunting season show an average of 27,000 animals taken. Another 27,000 are assumed to be taken by poachers.

\*In Wisconsin (where there are no moose) estimates show each wolf takes approximately 18 deer each year.

\*Assuming wolves in Maine would take between 15 and 20 ungulates per year, a population of 100 wolves would take only 5-7% of those animals killed by human hunters.

\*Collisions with motor vehicles (estimated 3,000-3,500 per year) would kill about twice as many deer in the state of Maine than a population of 100 wolves.

\*The beaver population of Maine is thought to be between 44,000 and 67,000. Of those, 10,000 are legally trapped. Maine's Department of Inland Fish and Wildlife's objective is to take 20,000 annually. Wolves could help here.

\*The Environmental Impact Statement done for wolf reintroduction to Yellowstone estimated that the animal's presence would lure \$23 million annually to that region.

Clearly there is much to be said for the restoration of wolves to the northeast and MWC's voice fits well into the chorus that is emerging to bring back the wolf.

John Glowa of MWC is very optimistic about his group's ability to work with the state agencies of Maine. Glowa



Photo by George Wuerthner

has met with the Department of Inland Fisheries and Wildlife to explain what MWC would like to see done to facilitate the wolf's return: appoint a Maine wolf recovery coordinator, develop a long term recovery plan, and create a data base to record possible wolf sightings. In addition both the MWC and the DIF&W are committed to working with the Province of Quebec as the state of Washington did with British Columbia. There, in deference to Washington's desire to allow wolves to recolonize the state, the province closed areas to the taking of wolves to allow corridors of travel for the wolves to move southward.

The Maine Wolf Coalition hopes to restore wolves by identifying and removing the barriers that now keep them from returning to Maine in numbers necessary for a viable breeding population. This is a patient approach that Glowa contends may take years if not decades.

Michael Kellett of RESTORE: The North Woods is skeptical of the possibility of wolves returning to Maine on their own. He cites the physical barriers between known wolf habitat and Maine as too great for any numbers of the animals to overcome. "The St. Lawrence Seaway, a wide waterway that is never allowed to freeze, would be extremely difficult to cross. Even if a wolf made it past this barrier, it would have little chance of surviving the wide swath of densely populated, heavily roaded, and intensely farmed land just north of the United States border." Still Kellett is not ready to advocate reintroduction, nor is he willing to rule it out, "We support public education on wolves as well as a regional study that looks at the alternatives. The scientific evidence will determine what needs to be done to bring the

wolf back."

For the moment wolf advocates have secured the cooperation of the Maine Department of Inland Fisheries and Wildlife. This winter that state agency will send researchers into the Maine Woods to look for wolf track and sign, and to attempt to elicit responses from wolves by playing tape recorded howls. How long IF&W remains involved in restoring the wolf depends largely on the findings of this winter's survey. If wolves are found in Maine, they could be added to the list of the state's endangered species that is due for its five year update this winter, and a recovery plan would be developed. If no evidence of wolves is found the state will likely lose interest in the project.

While state level action is crucial, Kellett warns that it is not the sole answer. State resources are limited and the restoration of the wolf to the northeast must be a regional campaign. Kellett sees MWC's work and his own (a two pronged approach that includes the reintroduction of wolves to Maine, and the establishment of a 3.2 million acre Maine Woods National Park to provide permanent habitat for wolves as well as all native species) as necessary aspects of a regional restoration plan.

The restoration of the wolf to the Northern Forest is a campaign that has excited thousands of people throughout the region. RESTORE has come nearly halfway to its goal of collecting 20,000 signatures to present to legislators to support a study of the feasibility of reintroducing wolves to their native range; new groups are forming to lend their support; and at least one national conservation group, Defenders of Wildlife, is pledging to join the cause.

So why all the wolf hoopla? Because it is a diverse movement that

represents a proactive approach to the restoration of an ecosystem. Some want the wolf back so that the Northern Forest ecosystem can regain balance with the return of its top predator. Some feel that it is our moral duty to restore a species that was locally annihilated by our ancestors. Some sense that wolves embody wilderness, and that their return to the Northern Forest would go a long way towards restoring the spirit of the wild to the region. Some look forward to the economic gains wolves have brought to other areas of the country. Some look forward to the return of the wolf for all of these reasons.

The challenge now is to form a regional coalition of all the voices speaking up for the return of the wolf. An alliance of lupophiles dedicated to bringing the wolf from our imaginations back into the forest. At a time when those who are fighting for the restoration of ecological health are being harangued by critics for overstating the problems of industrial society and for harping on negativity, the movement to restore the wolf represents one of a multitude of positive, visionary attempts to approach the restoration of ecosystems with the humility and reverence four billion years of evolution so deserves.

In the Fall 1994 issue of *Garbage* Bob Braille writes, "If Americans are yearning for values, for moral and ethical vision, why is it that the best the environmental movement can offer is the obvious, 'We stand for clean air, land, and water'?" He then asks, "...why is it that the environmentalists who are most in touch with the people—the grassroots environmentalists—are pulling away from the big national groups, thus fracturing the movement?"

The answer is simple, grassroots groups who support ideas such as carnivore restoration and the establishment of large ecological reserves have left most of the large national environmental groups in the dust. Environmentalism is not suffering from fracture and decay, rather it is thriving at the grassroots level by acting not within a rubric of perceived social and political reality, but within the realm of scientific reality. Those groups that have wedded themselves to compromise and mitigation are no longer receiving support from the public they have grown accustomed to receive. If the threats to biotic integrity are serious, then the solutions must be bold and honestly articulated to receive support from an increasingly astute public.

And so the movement to restore the wolf (to even the minute fraction of its former range that is being considered) continues to grow. Whether it is the Maine Wolf Coalition knocking down the Big Bad Wolf myth through public education, or RESTORE: The North Woods pressuring the federal government to take this question seriously, there is room in the chorus for any voice that sings out for restoring to the wolf its right to roam the Northern Forest.

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# Thinking Like a Watershed

## Reflections on Forested Landscapes & How They Work

by Steve Perrin

Far more than sources of water, watersheds are also great basins where the raw ingredients of our forests are collected and mixed. In that sense, a watershed is a place where the dark world of soil, water, and roots meets the luminous world of sunlight, air, and leaves, the two being joined by the flow of sap in the stems of plants and trees.

The union in green leaves of water from the soil with carbon dioxide from the air allows the energy of sunlight to be captured and stored in plant sugars and starches, giving rise to woods and wildlife.

The flow of fiber from the land depends on the flow of water to the roots of forest trees. That flow is one continuous stream. Without the soil, water, and nutrients supplied to our forests by the watersheds in which they grow, there would be no forest products industry in the State of Maine: no mills, no jobs, no rural communities.

Ponds, streams, and fish are watershed products, along with wetlands, forest canopies, the stems of trees, shade, ground cover, seedlings, and both wildlife and fisheries. The flow of every sort of life depends on the flow of water through watershed soils. To make sure that flow continues without interruption requires us to think of forest practices, biodiversity reserves, hydroelectric dams, and development of rural areas in terms of their impact on the watersheds they affect.

As a rule of thumb, that which promotes the long-term flow of native life under varying conditions is good for the region, that which stresses it beyond recovery is bad. Seeing human acts in a watershed context helps us evaluate their long-term effects. Resource extractors think in terms of what they can get out of a watershed; environmentalists think in terms of what goes into a watershed to make it work. The two perspectives are joined by the flow of soil, nutrients, and water through the land. It is to that flow we must look if we are to agree on a common vision for

the Maine Woods and our Northern Forest as a whole.

The study of forests and wildlife is often broken down into the study of natural neighborhoods such as plant associations or communities. While such communities may stand apart in our minds, in nature they are seldom isolated one from another as if sprung from the soil by chance. Their placement is anything but arbitrary. Seeds and pollen may be spread by haphazard means, but they sprout where they do because of favorable on-site conditions, conditions influenced by other systems in the same locale. Viewing landscapes as mosaics made of "separate" pieces does an injustice to their underlying integrity, for which the flow of water through soil is primarily responsible.

Plant communities influence one another over time as well as space. Each site has a history which shapes it, promoting certain types of soils, determining which ions and minerals are available, supporting a canopy whose features vary in harmony with the seasons. Communities take their place in a line of communities interacting on a given site, forming a continuous succession stretching from life's introduction through further and further stages of its local development.

Seeing the natural world in terms of separate plant communities and stands of trees invites us to fragment that world in our minds when, in fact, it is often better understood as a highly interactive landscape extending seamlessly through time and space. A landscape is made whole (healthy) by the connections between its parts. To understand why a certain community springs up on a particular site it is necessary to look at variations in the flow of essential resources joining that site to its natural surroundings.

The story of a watershed is told in terms of the continuous flow of water, soil, and nutrients from high ground to low across a given piece of terrain. That flow is governed by climate, gravity, and the lay of the land. They drive the

watershed economy, fixing what resources are made available, where, when, and in what amounts, and, too, what plants have a chance to take hold should they appear on the scene, and ultimately, what microbes and insects, birds and fish, game and non-game wildlife species.

Instead of dividing our knowledge of the natural world into smaller and smaller pieces, the watershed-as-gradient concept knits our understanding of bits and pieces into a larger whole, stressing the continuity and integrity of the landscape, not its division into arbitrary parcels and fragments.

If a watershed is a natural division of the landscape that integrates intermittent precipitation into a steady flow of water and nutrients through the soil, what else does a watershed do? A number of things, including:

- \*intercepts precipitation over a wide area;
- \*stores frozen precipitation for release when plants need it most;
- \*directs water across the soil, through the soil, under the soil by the most direct route;
- \*gathers excess water in channels, lakes, and underground reservoirs;
- \*collects and distributes ions, minerals, and organic particles throughout its extent;
- \*makes photosynthesis possible in green plants;
- \*supports storage, growth, reproduction, repair, defense, and respiration in plants;
- \*supports motion, communication, and social behavior in animals, as well as the more basic processes;
- \*makes possible the distribution of food from producers to consumers to predators;
- \*supports the breakdown of organic tissues;
- \*supports recycling of organic molecules;
- \*supports the breakdown of bedrock into a series of ever finer particles;
- \*harnesses erosion for the build-up of soils;
- \*redistributes soil components from

areas of steeper to more gradual slope, from higher to lower ground; \*stabilizes local climates and microclimates through the heat-holding capacity of water, and the warming and cooling effects of condensation and evaporation, and the moderating influence of shade;

\*joins a mosaic of disparate sites into a landscape featuring a unified flow of water and waterborne substances.

In brief, what a watershed does is collect, store, and distribute water, soil, and nutrients for use by plants and animals across a wide variety of sites, converting lifeless places to habitats. Without a reliable flow of those basic resources, none of that would be possible.

In liquid form, water is guided in its descent towards sea level by the slope of the land. Steep slopes drain quickly; gentle slopes drain slowly. The character of every watershed is built on those simple facts. A watershed is a place where water interacts with actual terrain, its flow being governed by gravity, slope, soil, the network of available channels, vegetation, the amount of water held in the system, and the input arriving as precipitation. We think of water as running off a given slope, but that is often an inaccurate picture. Slopes are more-or-less porous, holding water in spaces between the solid materials they are made of. When rain falls, it fills those spaces, encouraging seepage lower down rather than run-off from above.

Water held within a slope picks up organic and inorganic materials from its contact with the land. Precipitation increases the availability of those materials in streams and ponds as nutrients for aquatic life. Water runs not so much over the land as through the land, picking up nutrients, which seep in turn into streams whose life-giving character flows from headwaters where land and water have a strong interaction. Streams and lakes reflect the nature of their watersheds, their aquatic life depending on soils and vegetation upstream and upslope.



Dave Foreman's

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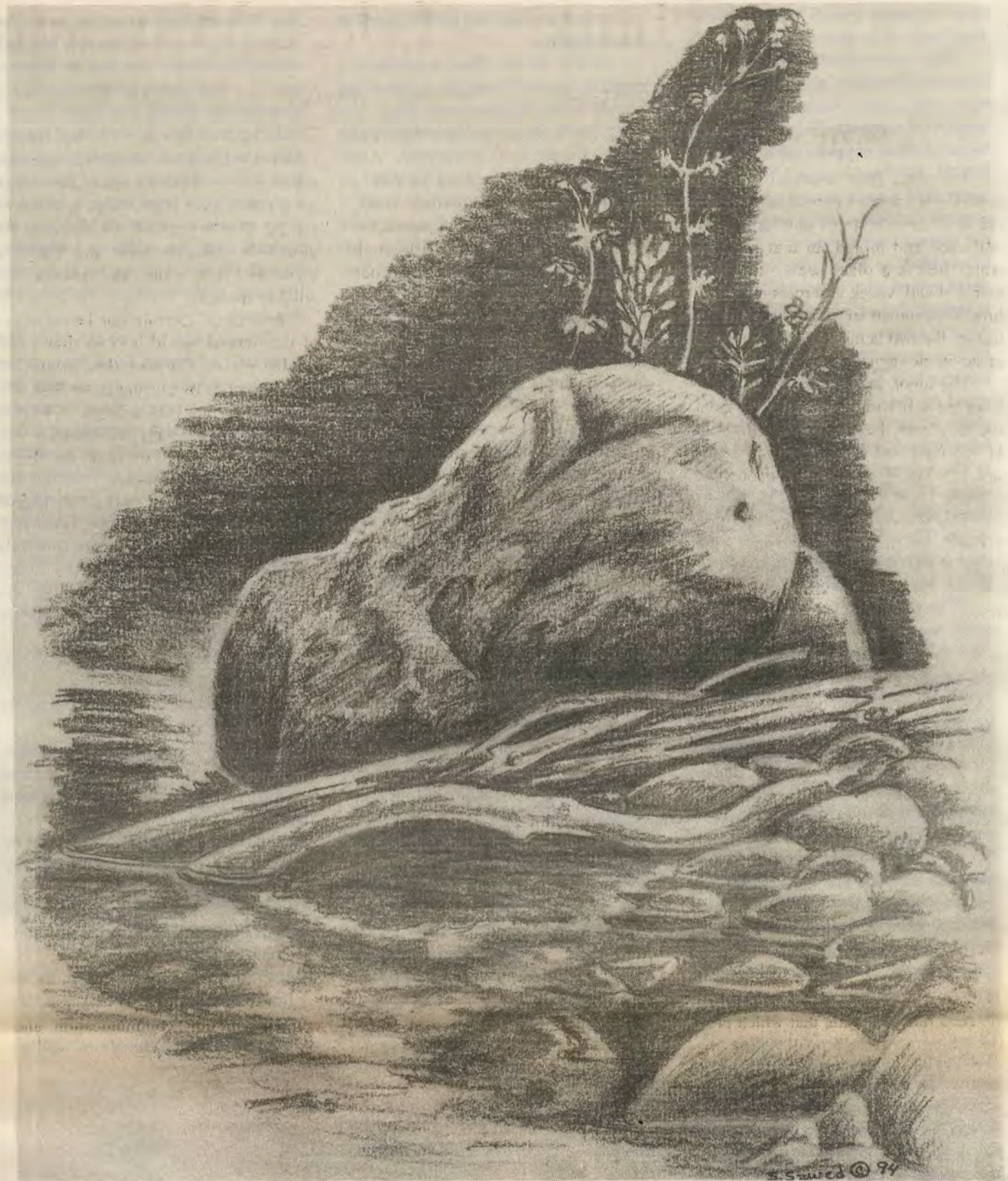
Flowing freely, water picks up particles of minerals and organic matter, carrying them downward, depositing sediments and soils in areas of lower elevation and lesser slope. From ridge to valley, watershed soils are distributed along a gradient, from thin and coarse above, to deep and fine below, with richness of organic content increasing top-down, upland to lowland, windswept ridge to alluvial bottom.

Erosion is a bad word when applied to the disruptive consequences of careless land use and development, but as the breakup of solid materials into finer and finer chunks and grains, together with their deposition downslope, erosion is not only natural but essential to the workings of watersheds. Gravity encourages mineral and organic materials to flow through a watershed, more slowly than water perhaps, but just as surely. As bedrock breaks down into smaller and smaller pieces, its surface area increases, providing greater contact with air and water, favoring the life they support. An ounce of typical soil contains roughly six acres of surface area promoting contact between air, nutrients, and water. Erosion also creates spaces between soil particles, spaces in which water becomes stored by adhering to grains of none-too-solid earth. Aquifers are underground lakes sharing space with porous soils and layers of fractured bedrock.

Watersheds are not only surfaces over which water runs downhill (or is "shed"), but three-dimensional volumes built up in layers, including layers of fractured bedrock, porous mineral soils, organic soils, fallen litter and duff, ground cover, shrubs, seedlings, saplings, and a variety of trees. Water flows through, and is stored in, every layer, holding precipitation for future use, maintaining a variety of moist environments in, on, and above the earth, releasing water slowly to meet the needs of microbes, fungi, mosses, plants, and animate life from unsung worms and centipedes to those few charismatic species endeared to the human heart.

The bulk of any watershed exists underground where water and soils interact. What we know of it is largely superficial, a matter of surface impressions, while the inner workings of a watershed are hidden below ground. A watershed is also a "waterhold," a place where the flow is slowed or held back for use by local residents of all species. Gravity, slope, and precipitation drive its workings, but it is the innards of a watershed that deliver water to aquatic life in swamps, streams, and lakes, and to terrestrial life through roots in the earth at the right stage of the growing season, creating fertile conditions, releasing life's urge to reach toward the sun.

In his powerful essay, "Thinking like a Mountain," Aldo Leopold makes clear that managing a landscape for a single resource of benefit to a single species can lead to the unwitting ruin of that landscape itself. He gives the extirpation of wolves from deer country as an example. Wanting all deer for themselves, human hunters press government exterminators to kill wolves in order to protect the deer herd from natural predation. The campaign is remarkably "successful." Wolves die out. The deer herd swells, defoliates its range—and dies of starvation. Or, if the landscape is



managed for cows, killing off wolves leads to overgrazing: "Hence we have dustbowls, and rivers washing the future into the sea."

Visualizing landscapes in terms of one resource or another leads to fractured thinking, fractured planning, and fractured acting in regard to both that resource and the larger landscape of which it is but one part out of many, all governed by their dynamic interaction. Seeing watersheds strictly in terms of water for municipal water supplies or industrial power generation ignores a great deal of what they are besides that. Watersheds also support rivers, lakes, wetlands, forests, and wildlife to the mutual advantage of every species in every part.

That is why it is a good idea to be flexible in our approach to watersheds, to look at them from a variety of perspectives: to look at them from the perspective, say, of a swamp or intermittent stream; to look at them from the soil's point of view, the native tree's and plant's points of view, the mushroom's, the microbe's, the gnat's, the worm's, the vole's, the hare's, the grouse's points of view.

Looking at watersheds, we need to take a fluid point of view, the point of view of a drop of water with a past and a future. If we do that, we have a chance of learning to think like a watershed as

a body in continuous motion, and to understand how it works on a day-to-day basis. Not in just one corner or another, but overall, ridgeline to valley stream, end to end, three-dimensionally from canopy down to bedrock. If we look at it all those ways, we'll see the big picture. We'll sense the tug of gravity on everything that moves. We'll sense the flow of water ridge-to-valley as guided by seasonal climate and the lay of the land. We'll see the importance of rainfall, snowpack, soil, and slope, and understand how a watershed is a basin of life and a crucible of erosion at the same time. We will come to understand what it really means to "go with the flow."

Thinking like a watershed means to appreciate life as an uninterrupted flow of vitality shared by all residents of an actual neighborhood within the landscape, each suited to its particular site across a range of conditions. From a watershed standpoint, the flow's the thing—of water and nutrients in the soil into the presence of air where life is kindled and fed by sunlight. Plants without stems (such as lichens and mosses) require that flow to take place on the surface, but those with stems linking their roots and leaves can draw water deeper underground over a much wider area, creating the forested landscape that is our home land.

Unless we can learn to think like a watershed, we have to ask ourselves whether we are qualified to intervene in its local affairs; whether we have any right to interrupt the distribution of water or soil, to extract resources, to disturb the pattern of the seasonal flow; whether we might not do more harm than good. To take a watershed's point of view requires us to see ourselves by a new light as meddlers in processes we know little about. If we can't work with a watershed, we stand to work against it. No matter how noble or profitable our intentions from a human point of view, in serving our own aims we might well disrupt the integrity of the homeland we seek to improve.

Take the watershed of Card Brook, for example. Card Brook flows through the city of Ellsworth, Maine, into the Union River estuary, its three branches draining a basin of some six square miles (3,800 acres). A power line and an abandoned railroad cut through it, and its central lowland is surrounded by a loop of roads made up of sections of Main Street, High Street, Hancock Heights Road, and U.S. Route 1. The highest point in the watershed lies 300 feet above the tide line in the estuary. Annual rainfall is about forty-eight inches, depositing one-and-a-third million gallons of water on every acre each year, supplying the watershed with a

total of some five billion gallons to work with on an annual basis.

The eastern half of the watershed contains extensive glacial deposits of sand and gravel, bearing the largest aquifer in Hancock County. Originally wooded, these deposits are now heavily mined, the road looping through the watershed passes one gravel pit after another for much of its length. Where the deposit isn't mined it is farmed for blueberries, or given over to industrial development such as sawmills, industrial storage depots, and maintenance lots. A golf course cuts into the central swamp from Hancock Heights. The western half of the watershed is dominated by the city of Ellsworth and 50 years of strip development that has taken place along High Street and Route 1. The center of the watershed within the road is a wetland featuring woods of tamarack, white cedar, and black spruce. The southern slope of the watershed is covered with spruce and fir fast giving way to malls and car dealerships.

The primary flow of water in the watershed of Card Brook runs from the sand and gravel aquifer toward the central swamp, and from there to the brook. The aquifer releases its water slowly, feeding swamp and brook in the driest of seasons. The brook itself is famous for trout, or at least it used to be. The fishing is not as good as it was. Human land use and development are having an impact on the natural workings of Card Brook. Every cubic yard of gravel removed from the pits reduces the storage capacity of the glacial deposits, decreasing the flow through the swamp. Herbicides, pesticides, and fertilizers sprayed on the golf course and blueberry fields enter the aquifer, and eventually flow into wetland and brook. The Town of Hancock designated the Washington Junction area on top of the aquifer as an industrial area meant to serve greater Ellsworth, a role it has served for over a hundred years, creating a pollution hazard which destroys the aquifer's value as a public water supply.

The story of Card Brook tells what typically happens to "junk land" seen as having little or no value. Eventually the gravel will be removed (as it was on the site now serving as the local airport), leaving the aquifer diminished or depleted as a natural reservoir of clean water. The central wetland will dry up, and developers will discover thousands of acres of buildable land within a stone's throw of Route 1. The tamaracks and cedars will be cut, the land subdivided and built up. In a hundred years Card Brook will no longer exist, its watershed having been taken over for municipal use to temporarily ease the pressures of population growth and urban sprawl.

The story of Jordan Pond watershed on Mount Desert Island in Maine has a happier (that is, more sustainable) ending. George Dorr, founder of Acadia National Park, wrote legislation in 1911 enabling the watersheds of Eagle Lake and Jordan Pond to be taken "for public purposes by eminent domain" in order "to protect the waters thereof from pollution."

Today these watersheds are largely given to recreational use, managed by the National Park Service for the twin objectives of resource protection and public enjoyment. Both watersheds are covered with mixed stands of deciduous

and evergreen trees and feature ponds of renown purity.

In the Jordan Pond watershed, a single structure (a seasonal restaurant) stands on its southernmost edge. The pond itself serves as the public water supply for the local community. Aside from that, human development is restricted to one automobile road, a graveled carriage road, and an extensive network of hiking trails. Under two square miles in area, the watershed contains 1,200 acres, receiving in an average year nearly one-and-a-half billion gallons of rainfall. The long axis of the watershed points south-southeast, so it receives ample sunlight. Its slopes are rocky and steep on both sides of the valley, rising 1,106 feet above pond level to the summit of Sargent Mountain on the west, and 974 feet to Pemetie Mountain on the east. Other prominent features include North and South Bubble, Penobscot Mountain, and Jordan Ridge. Soils are thin and subject to erosion, consisting of unconsolidated glacial deposits in low areas, exposed ledges of granite on the upper slopes, with extensive talus slopes at the base of steep cliffs. The sun is above the horizon for nine hours at the beginning of winter, fifteen hours at the beginning of summer. Annual snowfall measures on average sixty-eight inches. Such are the bare facts and statistics.

One look at the valley of Jordan Pond (from the edge of the pond, say, or the summit of North Bubble) reveals something else: the entire watershed is alive. Vegetation covers all but its steepest slopes, and a closer look shows them to be decked with lichens, mosses, and ferns. At a glance the watershed appears as a basin of life which directs water falling within its rim downward across its slopes toward the pond at its center

and the wetlands on either end. The slopes are green at any season, but their animal inhabitants can best be appreciated in winter when tracks record their movements across the snow. Here a ruffed grouse flew down from a branch; here a red squirrel bounded tree to tree; here a fox inspected a tuft of grass; here a mouse came from under a stone. In every season a variety of birds use the updraft over the cliffs as a highway through the sky. And anglers know what life lurks in the depths of the pond 150 feet down.

Thousands of people visit the watershed of Jordan Pond through the seasons, arriving by car or bus, but going on by bicycle, boat or canoe, horsedrawn carriage, snowshoes, cross-country skis, snowmobile, or more likely on foot. They come to celebrate the watershed, and to enjoy the values enhanced by its protection. Here they find nature in good working order, a rare experience for many of them. People have a place in this setting, but aside from restaurant and parking lot, they do not dominate the scene.

When studying a particular watershed, we need to know:

- \*the watershed's size, including its length, breadth, and area;
- \*the nature of its terrain, including lowest and highest elevations, steepness of slopes, and something of the local geology;
- \*the amount of precipitation falling on it monthly and yearly, including rainfall and annual snowpack;
- \*how much water is carried by its streams, and the volume of water stored in its ponds;
- \*some idea of the local climate, including average and extreme temperatures, wind direction, and the direction the watershed faces (its aspect);

- \*length of growing season;
- \*description of soils in different parts;
- \*types of vegetation supported by those soils;
- \*animals supported by that vegetation, including insects, fish, amphibians, reptiles, birds, and mammals.

Above all, we want to understand how water and soil flow through, and are held by, the valley at each season, giving us a feel for life's well-being through the year and the years.

Against that background of factual information, our scenic appreciation of a given watershed is greatly enhanced. We approach it as an active, living being in its own right, whose appearance tells a great deal about the shape it is in. Scenically attractive watersheds are healthy and in good working order. Unattractive ones are not. We know that intuitively without having to be told. Anyone who has walked through a clearcut area where a forest has recently been felled knows she is following in the tracks of a mechanized disaster. The landscape is universally brown and gray, soil is exposed to wind and sun, water has risen out of the ground to flood low-lying areas, and the overall integrity of the living landscape has been destroyed. Recovery will take a hundred years, and even then there will be impairment due to lost soil and lost life.

The great advantage to be had from taking up the watershed perspective is that it works. It took me less than three years to make a good start at learning to think like a watershed. During that time I was living on an island of thirty-two acres in an estuary on the coast of Maine. I began by thinking about watershed to better understand why certain plants grew where they did. Why red pines and mountain cranberries grew in one place, columbine and saxifrage in another, northern white cedars somewhere else. There was an order I did not understand imposed on the landscape. I wanted to find out how it worked.

The watershed in which I lived was not a valley at all, but dome of bedrock whose slopes did not direct water to a common collection point so much as send it splaying in every direction in an outward and downward flow toward the surrounding saltwater bay. There are no swamps, streams or ponds on the island. Where rain went after it fell or snow when it melted was anything but obvious. Water had to be available through the seasons to support the island's dense cover of evergreen woods. At the start that's all I knew.

I began thinking about the flow of water through the soil when I came across great bulbs and mounds of smooth white ice around the edge of the island in winter. Freezing in such massive forms, water revealed its secret flow in a very dramatic way. I was struck by how bold the pattern was, and how thick I must have been not to see those obvious seeps before. Those blobs of ice always came out on the shore where alders, sphagnum moss, and white cedars grew. There had to be a connection between them and the flow the ice made so evident.

Gradually I put the picture together. Plants need sunlight, air, and water to grow. Availability of the first two isn't a problem on the island, but water is always an issue. Soils are typically less than six inches deep, a thin mantle resting lightly on ledges of bedrock. Trees





blow down in every storm, upended networks of roots showing how tenuous their grip had been, how wide they had spread to find water in the shallow earth. I lived in those island woods long enough to experience the difference between easy winters and hard ones, short ones and interminable ones, warm ones and cold ones. I began to understand how the seasonal climate affects islanders of every sort, sometimes beneficently, sometimes adversely.

I saw evergreens die from drought both winter and summer, voles driven from their grassy tunnels by floods, white hares betrayed by fickle snows that never came—and brown ones by snows that stuck till May. It was the best education I ever got. For two-and-a-half years I watched the natural world at work, slowly developing a feel for life's dependence on water, a fact I had long taken for granted, but never fully appreciated.

The ground is hard in winter because it's frozen, everyone in New England knows that. What I hadn't thought about before was that it's not the ground or soil itself that freezes, but the water it contains. That simple realization brought home the fact that there's water in the soil all the time, though it largely escapes my notice. I began to connect those great knobs of ice along the shore to the flow of water through the soil—one of the great discoveries of my life.

Then there was spring! How slowly it comes to the coast of Maine! Winter doesn't retreat all at once, but stalks off in a series of transitional stages. First comes ice season, then slush season, followed in turn by mud season, mud season, and mud season (also known as pothole season). If you want dramatic evidence of how much water is held in the soil, watch Maine from mid-March to early May when the ground turns from white, to gray, to brown soup. That is when all the moisture locked as snow and ice through the winter is released, flooding the land, rousing watersheds from their frozen slumbers.

Streams swell, rivers overflow, icy ponds break up, channeling excess water toward the ocean. But that is just the thawing tip of the underground iceberg. Most water is retained by the soil, which softens as the temperature rises, inviting roots to drink up once again. Which they do slowly at first, then in great swigs and gulps, carrying water to thirsty buds, providing a fluid environment in which cells can divide and new growth emerge.

Experiencing these changes on the island, I came to see how the flow of water in plants was connected to the flow of water through the land, and how the miracle of life depended on both. What is growth but the streaming expansion of cells into unclaimed territory? Water is the medium of supply to plant tissue, allowing it to swell, increase, expand, advance—that is, to grow. Without that watery medium, life could not spring from the earth and spread its branches toward the sun. Watching buds swell day-to-day, I saw how plants flowed into space, reaching into their surroundings by way of ever-lengthening vessels and stems. Not only do watersheds supply water to full-grown plants, but they help those plants get a start in the first place by assisting at their birth. Without ample water in



the right place at the right season, none of that would happen.

Plants—all plants—are outward and visible signs of the dampness and waterborne nutrients available to their roots and other absorptive tissues. That dampness and the nutrients it carries depend, in turn, on the storage capacity of the soil, and the replenishment of the local supply from sources upslope. Once I understood the seasonal and three-dimensional structure of the island as a water distribution system, I began to understand watersheds in terms of the water they make available across time and space to a variety of species having different appetites and tolerances. Watching hundreds of spruce seedlings die, and the needles of a mature white spruce turn brown and fall off in July after a month-and-a-half without rain, I realized they had drained every drop of available water from the soil and had all died of thirst. In the same drought mosses curled their green tissues in upon themselves, exposing a tough brown underlayer which helped preserve what little moisture was available from fog and dew. When it finally did

rain in late August, they unfurled their tender parts and seemed to shine with an inner green glow.

Fall is a generous season on the island, plants dropping their leaves within a matter of weeks, adding organic matter to the duff, aiding the causes of soil formation and water retention, contributing to the welfare of coming generations.

I still carry the watershed perspective I won by opening my senses to life on that island, applying it daily to new surroundings, developing it, trusting it to lead me nearer and nearer to the truth of life on island earth. It is not true that people are the be-all and end-all of all creatures. We rose from others, among others, casting our lot with other species as we fitted ourselves to a succession of fertile landscapes which we adopted as our homelands and native habitats.

If we have recently come to believe in our freedom from ties to the land, stressing our mobility over our rootedness, separating ourselves from such base constraints as soil, rocks, and water, distancing ourselves from any obligation to pay for what we claim as

ours, or to restore to earth what we have taken in the past, claiming it as our due, then the time has come to appreciate the extent to which that separation and sense of distance are not true and absolute, but stem from attitudes and perspectives which may have served a fortunate few briefly in the past, but will serve none of us in the long run ahead. Everything we value flows one way or another from a watershed.

The choice is ours: to ignore the primacy of watersheds as distributors of earth's vital resources, seeing only our limitless needs; or to accept the rootedness in the land itself of every human value, and our springing from that land as the ultimate gift to which we ourselves have, if not the obligation, certainly the opportunity of being true.

*Steve Perrin writes about water from the Maine Coast. This essay is adapted from a collection titled "Watershed File" available from the author at: Watersheds Are Us, POB 585, Bar Harbor, ME 04609-0585.*

# Conte National Wildlife Refuge: Ecosystem Management in the Connecticut River Valley

by Andrew Whittaker

Today, the Connecticut River valley presents a mosaic of all its cultural phases: native, agrarian, industrial and ex-urban. The survival and restoration of its natural heritage, which must occur amidst this complexity, has a new ally in the US Fish and Wildlife Service, the agency in charge of the Silvio Conte National Fish & Wildlife Refuge established by Congress and currently in its planning stages.

The Conte Act charges the F&WS with the responsibility to "conserve, protect and enhance" specified wildlife populations—Atlantic salmon and bald eagles, for instance—and the overall ecosystem upon which all the Connecticut watershed's plant, fish and wildlife depend.

As part of project planning, and in response to some negative opinions expressed toward the Refuge in public hearings, the F&WS last spring held four weekend long retreats to which they invited Valley stakeholders of all stripes: landowners, conservationists, planners and politicians.

Its mandate in the Connecticut River watershed brings the F&WS into the wider realm of ecosystem management, away from its narrower, more traditional role of establishing and managing wildlife refuges with the goal of protecting quite specific habitats and species. Success here in achieving protection goals outside of traditional refuges, across an entire landscape, will provide a model for other parts of the nation. Participants at last spring's retreats worked toward consensus on how the F&WS can achieve its goals in the context of current land use.

## Up & Downriver— Economy Meets Ecology

In general, economic concerns and the protection of property rights were more common themes in the two more northerly sessions (Fairlee, VT and Franconia, NH), while participants in Massachusetts and Connecticut focused more intently on conservation and protection from development. Nonetheless, all sessions, with differing points of emphasis, identified landowners and traditional agricultural and forest uses of the land as key components of any conservation strategy.

The differing focus and fears perhaps reflect what Mollie Beattie, Director of the USF&WS, refers to as the two northward moving lines in New England—development, and ahead of it, the confidence that: "It can't happen here."

Interestingly, participants at the southernmost session, in Cromwell, CT, who proposed the Refuge take on wide jurisdiction, embracing the entire watershed and not merely the immediate Valley, also expressed concern that conservation mandates be flexible enough to adjust to specific needs of each River region.

The Cromwell session, in common with the other three, viewed preservation of the traditional land-based economy as a fundamental approach to conservation. Specifically, participants recommended the waiver of inheritance taxes on parcels of wood and agricultural lands, lessening the fragmentation of



*Forest Liquidation in Whitefield, NH continues. This photo was taken in October 1994, six months after Jim Wemyss, Jr. sold them to local forest liquidator, Ted Ingerson whose mechanized equipment is capable of clearcutting four acres a day. The 1800 acre tract is adjacent to wetlands, and it is in the Connecticut River watershed.*

habitat by encouraging such lands' economic integrity.

The Chicopee session in western Massachusetts's Pioneer Valley, at once the river's most urban and greatest agricultural region, broached perhaps the most expansive role for the Refuge. A flexible, evolving "bioshed" model should facilitate the intermingling of human and natural environments—with some participants emphasizing outright land acquisition of critical habitats and others the expansion of existing, non-acquisition conservation strategies aimed at the preservation of farmland.

Northward, sessions at Fairlee and Franconia also endorsed habitat protection but with the caveat the F&WS not employ land condemnations or eminent domain—which has, in any case, rarely been exercised by the Service, and, USF&WS officials explained, is of no interest here.

More proactively, participants in Franconia envisioned the Refuge becoming part of the region's economic landscape. If visitors were granted access to the Refuge by purchasing a user's permit, for instance, funds generated could be funneled back to communities and landowners participating in the preservation of Valley habitat. Perhaps lying outside the Refuge's purview but certainly underlying many of the concerns expressed, was the acknowledgment of economic difficulties faced by resource-dependent economies. Effective conservation will have to direct the flow of economic resources to environmental initiatives in agriculture and forestry.

## Education Centers & Watershed Councils

Other recurring themes that the F&WS brought away from the four planning sessions address education, Refuge governance, coordination of government initiatives and biological inventorying.

The F&WS should play a coordinating role amongst the many private, state, federal and local agencies already at work in the Valley, said many participants. The layering of jurisdictions is already quite exquisite here; the hope is that the F&WS can act as a clearinghouse of information and coordinator of conservation strategies, placing them in the context of the wider ecosystem, and

at the very least, ensuring that the right and left hands work in coordination.

Included in the Conte Refuge legislation is authorization of four educational facilities, one for each region of the watershed. All planning sessions addressed education as a key component in long term implementation of the Refuge. Franconia participants detailed their view of an education center that would: (1) interpret the upper headwaters of the watershed for the visitor, acting as an interactive introduction to the region's ecology and cultural history; (2) act as a springboard for Youth Conservation Corps type initiatives in conservation, restoration and recreation facilities throughout the headwaters area; and (3) illustrate the role of responsible farming and forestry in landscape conservation.

Implicit in many of the workshop ideas was the need for what Franconia participants stated explicitly: a grassroots advisory council for the Refuge, composed of citizens representing all stakeholders in the Valley (specifically, expanding the role of local sub-committees of NH & VT's Joint River Commissions). The feeling in Franconia was that consensus is a process, not a final product, and that there is as much need, if not greater, for discussion and debate to occur at the grassroots as in Washington, if genuine solutions to real environmental conflict are to emerge. For the Refuge to build on local consensus, the F&WS must be at the very least a listening participant in local dialogue.

## Federalism at the Grassroots

Will the Refuge work? As a participant at the headwaters session, where some contentiousness was expected owing to earlier hostility expressed by some landowners toward the Refuge, I believe—judging from the results both in Franconia and downriver—the Refuge can achieve its highest expressed goal, which is to create a new model for ecosystem management.

It can do this by bringing Federal initiative to the grassroots level. Part and parcel of any national government's arrival in the hinterlands these days is the venting of frustration. The reason this is so, quite simply, is economic: areas dependent on agriculture, fisheries or forestry are chronically depressed. The way forward is for farmers,

foresters and fishermen to rejoin the vanguard of innovation—their traditional role since before the Magna Carta. Innovation in the Refuge's case is the active linking of ecology and economy through education and conservation.

It will in fact take the federal presence to achieve this goal. The Conte Refuge involves four states and even a fifth, considering Long Island Sound, and cuts across the jurisdictions of numerous agencies. The Feds, in a word, get folks talking, breaking the self-defeating impasse of narrowly defined interest. But for strategic reasons, as well as tactical, federalism should prove an ally to the grassroots. Federal initiative in this case created a venue for local dialogue, once encouraged, to be amplified and implemented regionally. Regional success here can create a model for Western watersheds perhaps, or the Tennessee Valley. If our economy is facilitated federally, subject to the whims of nationally-sanctioned chemical companies, for instance, our ecology must have access to a similar level of resources.

## New Deal for Farm & Forest

It is easy to spin the yarn that ecology and economy are one entity, difficult to actually achieve on the ground. Further, several of the reasons our farm economy is chronically imperiled—and that our fisheries are depleted and our forests run down—reflect our federal government's fumbling initiative in encouraging the survival of small-scale capitalism, particularly in the rural sector. In the Connecticut Valley, there is the opportunity through proactive, coordinated policy to create a New Deal for farming and forestry-based enterprise. We have to approach this in many ways: the creation of a low-input, value-added, market-sensitive agriculture and forestry requires initiative from within agriculture as well as structural support from without. [See adjoining article on *Permaculture*.]

Change must occur in all areas—regulation included. The latest issue of the American Forest Foundation's magazine, *Tree Farmer* (house organ of the American Tree Farm System) continues its coverage—journalistic and editorial—of what it characterizes as strangulating regulations. This issue lauds recent legislation in Mississippi that restricts nuisance law from shutting down logging operations; a "Dan and Joe" story illustrates the binds placed on a North Carolina landowner who has red cockaded woodpeckers in the woodlot he wants to cut to send his son to college. As a barometer of landowner opinion (as well as reinforcer), *Tree Farmer* and the general run of farm journals undoubtedly reflect widespread feeling toward the Endangered Species and Clean Water Acts—perhaps the babies as well as the bathwater.

Two thoughts come to mind. Without a doubt, wetlands regulations must prove more flexible in the field—and not just for the good of the landowner. If provided with site-specific information relating to species' needs, most landowners will act in accordance with them. Simply requiring landowners to file more papers and pay more fees ensures that federal initiatives to secure habitat will eventually be ignored. A role the F&WS could play in ecosystem

management is on-site evaluation and management plans for landowners—perhaps by fielding a Youth Conservation Corps trained for the task.

Second, do the *Tree Farmer* and other publications that take advertising dollars from American Cyanamid and other pesticide producers argue in entirely good faith? There is a strong positive correlation between negative editorial stance toward wetlands regulations and pesticide advertisement. Such journals often will tell farmers and landowners that their property rights are an absolute. To me, with only a layman's appreciation for the law, absolute right confers absolute liability. Are users of pesticide willing to assume absolute liability for its use? (Note: last spring Monsanto sent me a newsletter sharing the news that, with swifter testing procedures, they can unleash a greater magnitude of chemicals on the market [read: environment]—something on the order of 100,000 a year.)

A dialogue must occur at the grassroots: what are agriculture and forestry's roles in the environment to be? Most fundamentally, those who grow our food and harvest our timber and otherwise deal directly with the environment must use government initiatives such as the Conte Refuge to present consumers with the choices our economy creates. We can have cheap food and salinized soils, pesticides and endangered species, or, we can devote ourselves to the task of creating an ecologically self-regulating agriculture.

Participants in the Refuge planning process have effectively presented the landowner and producer's points of view and quite correctly placed farmers, foresters and other landowners at the center of Refuge progress. We as a society can have a local means of food production, and enjoy the fruits of a thrifty rural economy that acts as arbitrator

between human and natural environments—but only if the wider populace can recognize and be willing to pay for

these benefits. For their part, landowners must be willing to respond to greater

regulatory flexibility and economic changes by heightening their level of stewardship.

As it is, the public supports conservation initiatives, values regulations that ensure environmental quality and food product safety, and is in fact the true source of many of the regulations of which landowners complain. Will consumers pay a higher price for systems of farming and forestry that don't merely safeguard human health but also actively preserve an ecosystem such as the Connecticut's for the Atlantic salmon, black bear, osprey or salamander? In other words, will the public accept the internalized cost of stewardship in the prices they pay for staple goods?

The answer is as clear as we choose to make it. Education, as Conte planners (and others involved in the Northern Forest Lands dialogue as well) agree, is critical. Maintaining the viability of farming and forestry at a small scale is essential. Refuge expertise must supply local planning officials and landowners of the region the resource inventories and comprehensive information they need to act in concert with regional conservation goals. The interior workings of this process must be as visible to the public as the landscape it protects: once seen and understood, the public will understand the choices they must make as well.

The essence of a New Deal here is a bargaining table agreement: agriculture and forestry will protect the natural ecosystem in which they operate; wider society will re-direct our economy toward rewarding ecological means of production. The Fish & Wildlife Service can fulfill its mandate to protect and restore the Connecticut Valley ecosystem and act from the spirit of its planning sessions, by acting as catalyst for this vision.



*The beautiful Connecticut River meanders through floodplain farm fields between Groveton and Lancaster, NH. Photo by Peter Riviere*

## Report on Connecticut River Water Quality Shows Need for Better Monitoring

New Hampshire and Vermont have issued the results of their first joint water quality assessment of the Connecticut River watershed. Funded by a federal EPA Clean Water Act grant and further charged by the two-state Joint River Commissions to answer basic water quality questions, the study was conducted by Vermont's Agency of Natural Resources, Department of Environmental Conservation and New Hampshire's Department of Environmental Services in 1992 and 1993. The joint effort provides a basis for further coordination of water quality protection plans, dam re-licensing procedures and common testing priorities.

The study sought to answer eight questions about water quality in the Connecticut River watershed. Are river and watershed waters drinkable, safe for swimming and the fish safe for eating? Do dams contribute to water quality problems? Is there healthy aquatic life in the river? Can the river's waters absorb more treated waste, on the one hand, and offer a source of water for irrigation, drinking or other uses on the other? Does New Hampshire and Vermont agricultural activity contribute to nitrogen pollution of Long Island Sound?

In general, answers to these questions indicate the progress made in restoring water quality to the Connecticut after decades of abuse. The waters are widely swimmable, potable and livable. Indications of stress do not point to crisis so much as they do to chronic yet tractable problems. Recommendations identify areas where further fieldwork is required to determine the nature and extent of threats and where conservation efforts should be directed. As noted in the study report, limited funding (\$100,000) circumscribed the states' ability to make a comprehensive, in-depth assessment of the watershed's health.

Many if not all of the posed questions are connected, particularly those focused on hydro dam impact

and aquatic health. While the natural progression of the Connecticut's riverbed from rapid and oxygenated to slow and turbid partly explains the downward trend in bottom dweller organisms (or macroinvertebrate) populations (an indicator of overall health) as one moves downriver, dam impoundments also contribute to increasing sedimentation, nutrient enrichment and other drains on water quality, such as concentration and transformation of toxins, as noted in the report. With over half the 267 miles of river between Vermont and New Hampshire subject to impoundment, dams and reservoirs are perhaps the greatest human feature impacting water quality identified by the study.

This is of particular relevance as two major dams, Moore and Comerford, face re-licensing in the years ahead. The report recommends comprehensive review by state and federal agencies of dams' impact on water quality and the mandating of site-specific studies by licensees up and downstream of dams.

One recommendation takes account of the largely undetermined presence of toxins in the river and urges funds to conduct toxicological study on water, fish and sediments. Although fish tissue analysis has been meager in the watershed, the need for it has been established. A New Hampshire Department of Health study in 1988 found "some concern" with levels of cadmium, chromium and PCBs at certain river sites. The U. S. Geological Survey is currently beginning further monitoring of chemical and biological impacts on the river, including fish tissue analysis. The need for such testing is mentioned throughout report conclusions and recommendations.

Any scholar of the Connecticut River will want to take a look at the sub-region reports, intended for use by JRC subcommittee members of these regions. In the case of the Headwaters, what emerges is the essentially

pristine quality of the river from the Connecticut Lake headwaters to the Upper Ammonoosuc River. As elsewhere, threats and impairments to water quality have been identified here by the separate states. There is the usual concern with water flows and nutrient loading at dams. Vermont has targeted certain Connecticut tributaries in Vermont's Essex County for improved logging practices—this and streambank erosion being identified as the main sources of eroded sediments of the Headwaters. Despite these problems, this lively stretch of river offers surrounding communities a unique resource deserving special status and protection.

Low dissolved oxygen levels become a problem south of the Upper Ammonoosuc, where the river both slackens and receives discharge from the paper mill at Groveton. (The state of Vermont recently and successfully fought to increase water flow over the dam at Gilman, site of another mill, to raise oxygen levels.) Behind the several dams lower down this lakelike Riverbend region, nutrient loading from industrial and agricultural sources may be over-enriching the aquatic environment, a dynamic similar to that occurring in the slow moving waters of the three lower sub-regions (termed Upper Valley (Oliverian Brook-Mascoma River), Mt. Ascutney (Mascoma River-Cold River) and Wantastiquet (Cold River to Massachusetts)).

The report concludes that streambank erosion is "a major problem for the Connecticut River" and recommends involving citizens in inventory and monitoring efforts that would pinpoint problems and direct agency actions. Further, inventorying techniques should be broadened to include habitat surveys for better assessment of aquatic (might we say ecosystem?) health. The report also recommends the Joint River Commissions complete a management plan for the river.

A.W.

# New Direction for Forestry & Agriculture—Perma(nent)Culture

by Andrew Whittaker

Nostalgia for the '70s????!!!!

Society as filtered through the blandness of *Time* or *Newsweek* insists on the late counterculture's essential hedonism, as recently re-played at re-Woodstock. The '70s, to light on that time when hip-ness came to a head, also brought the flowering of a reorientation of food-related innovations in agriculture, diet and marketing. Witness the health food store, farmers' markets, organics and interest in whole-grained vegetarianism.

The personal being political, many who tuned in and turned on to cultural reformation saw the most effective means of revolution as a new relationship with food. Given the steady institutionalization of organic agriculture, food co-ops and healthier diet, this may indeed be the '70s' greatest legacy. Whether we thank the hippies or look to the straight arrows who preceded them (the Rodales, Rachel Carson, Wendell Berry or any number of other dissenters from the chemical agriculture that gained vigor after World War II), the '70s were a time when the focus on the Big Issues that dog us still promised quick and fundamental change.

In retrospect, we in the US took the political course that, for instance, Hazel Henderson feared we might: a vacation from troubles in a politics of avoidance and fiction. That the debt left from this binge hobbles social investment today is only one drawback; another is that discussion of social policy remains centered on macroeconomic dial twirling. We can look back to the '70s as a gritty yet heady time when folks still met in church basements to discuss in urgent tones the need for a Food Policy, an Energy Policy and other fundamental changes to social structure. What was strong then was faith that Democracy was a force equal to entrenched economic interests.

## Old Toryism & New Tribalism

Now, even as we have a White House that is reportedly interested in the *Atlantic Monthly's* ongoing coverage of what might be termed the new world disorder—national governments themselves breaking down under population, ethnic and resource-depletion pressures—the belief continues unabated that solutions to local problems can be provided by building a stronger global economy.

The focus on agriculture thereby remains one of keeping farming afloat in the face of huge surpluses—we shall export them—with nary a whisper that surplus producing agriculture causes the decay of rural communities. Surpluses undercut farm profit, invite the substitution of capital for (family) labor as producers strive for economy of scale and encourage the destruction of a conservation-oriented agriculture.

Martin Harris, writing in *The New England Farmer* has observed the trend in the industry toward big monopolies and more centralized control of food production (and prices). Although not entirely encouraged by this, he does note that it makes the small, traditional farmer's best strategy to specialize, develop marketing niches and, above

all, remain debt free (ie, free from the vagaries of short-sighted macro-economic policy).

The insight of the '70s that has fueled the faith of those in the field pursuing a sustainable agriculture is that present modes of production are not tenable, either thermodynamically or socially. (English literature has been documenting the ravages of industrial and commercial agriculture since the Enclosure Acts broke traditional social bonds in the English countryside. Urbanization and attendant alienation, as we now call loneliness, dominate art and literature of the 19th and early 20th centuries. Science and technology have so triumphed culturally today that little other social context exists from which to base observation or sensibility. Is this why music, the most Dionysian of art forms, is ascendant?)

To avoid a foreign policy absolutely subservient to domestic energy needs, the US must re-fashion agriculture—both as the incredible energy waster it is (counting all food production and distribution), and as the catalyst to rural health it could be. Environmentalists of the new tribalist school only stir the pot further, with the often (seemingly glib) observation that society must evolve back toward a hunting-gathering state. Their critique of humanity indicts the post-glacial agricultural revolution for destruction at its seat, Mesopotamia, and so on in the path of the great empires: Greek, Roman, and British.

The simple pieties of agriculturists, stretching back in our own culture to European "high farming" of the Middle Ages, are inadequate to the task of reforming agriculture. More is needed than legumes and manure to accomplish an agriculture that will feed the world but also allow our natural ecosystems to perpetuate themselves.

## Permaculture

Permaculturists are agriculture practitioners for whom the principle of intensified production and design will achieve the goal of sustainability. Scan

a text of Bill Mollison's, one of the premier permaculturists, and you will find among his many practical guidelines and ideas the ethical cornerstone of permaculture. Man must stay out of the bush, all remaining natural forests must be protected in their existing state, we must intensify the functioning of our homesteads so that wilderness can remain to the species requiring it—humans included, as Mollison makes note of the milieu from which we sprung.

And even beyond that: nature itself is the proper model for our farming and gardening. Fundamentally, permaculture is ecosystem design on a micro-level. The key to efficiency is intensive design creating an ecology of farm and garden components including human labor, tree and other perennial crops, animals and local energy systems. Land and resources should be liberated by such intensification and left to go as they will.

Before his untimely death while on a mission to bring his non-chemical, non-industrial vision for agriculture to Russia, Robert Rodale mused in an editorial (in his *Organic Gardening* magazine) on the role of humans in the next economy. He was troubled by predictions that robotized labor would be displacing humans. Rodale, ever the moderate, arrived at the conclusion that humans desire service (especially information) in their economy. Agriculture would retain a need for humans because only humans, he reasoned, can provide high levels of service, as in a garden-based agriculture.

Mollison and other permaculturists carry this idea further (while also rejecting the hyper-tech model that Rodale accepted as inevitable). Human labor as they see it is not just socially but thermodynamically necessary; more people must orient themselves to provisioning their own needs because the biosphere's health requires we shift out of massive energy consumption. The alternative—an agriculture and wider society based on Big Energy—will require increasing-

ly untenable social policies (war, expensive investments) as well as ruinous ecological demands (pesticides, dams, radioactive waste). The key is that human inventiveness, emulating nature, creates farm ecology.

Perhaps permaculture's most intriguing aspect is its de facto decentralization of research and science. Every microsite requires its own evolution and development, based on observation of the natural forces existing there. (Human governance will evolve in the same way, by locality, within watersheds.) The instant solution of herbicide is absent in permaculture. Indeed, permaculture views the neat and tidy appearance of monocrop culture as chief symptom of the chaotic inefficiencies our agriculture imposes on the environment.

## Conclusion

The Connecticut River Valley is ages away from perma(nent) (agri)culture. But, with the food-ferment of the '70s having brought a fresh wave of innovation here in the form of low input, value-added and organic agriculture, we've taken first steps.

The role the river plays, the role it has played, is that of a transcendent wisdom we can return to, despite several centuries' neglect and desecration. It occurred to me once this summer as I hoed my celery (like the Roman) many miles upriver from Long Island Sound, yet wishing for a load of eelgrass to add to my sandy terrace soil. After all, isn't it only right the ocean make some return of nutrient for all the sediments we upriver send it?

Then, of course, I recalled that once upon a time, with the salmon and shad runs each spring, Nature of its own accord made that return—and much more artfully than with a truckload of seaweed pattering along blacktop. Native peoples of the Connecticut Valley had the humility and insight to base their culture, fertilizing their crops and feeding themselves, on that return. Maybe someday we will too.



# Who Will Save the Forests? Knowledge, Power & Environmental Destruction

Edited by Tariq Banuri & Frederique Apffel Marglin  
 Published by the United Nations University  
 World Institute for Development Economic Research, 1993

*Who will Save the Forests?* presents four case studies—two in India (one of which is about the Chipko, or Tree Huggers movement), one in Finland, and one in a place called Maine. The aim of the book is to look at the role of knowledge and power in the process of modernization. The book tries to show how the use of resources, such as forests, are a reflection of the knowledge systems that dominate. Modern forestry (called “scientific”) has been given highest status, while alternatives have been viewed as irrational, emotional, primitive or even non-knowledge.

The editors find three problems with “scientific forestry”:

- 1) it legitimizes colonization and exploitation of the object of its knowledge;
- 2) it is used to justify short-horizon commercial practices, rather than the pursuit of genuine long-term interests; and
- 3) direct state control compounds the problem because of corruption, inefficiency and waste.

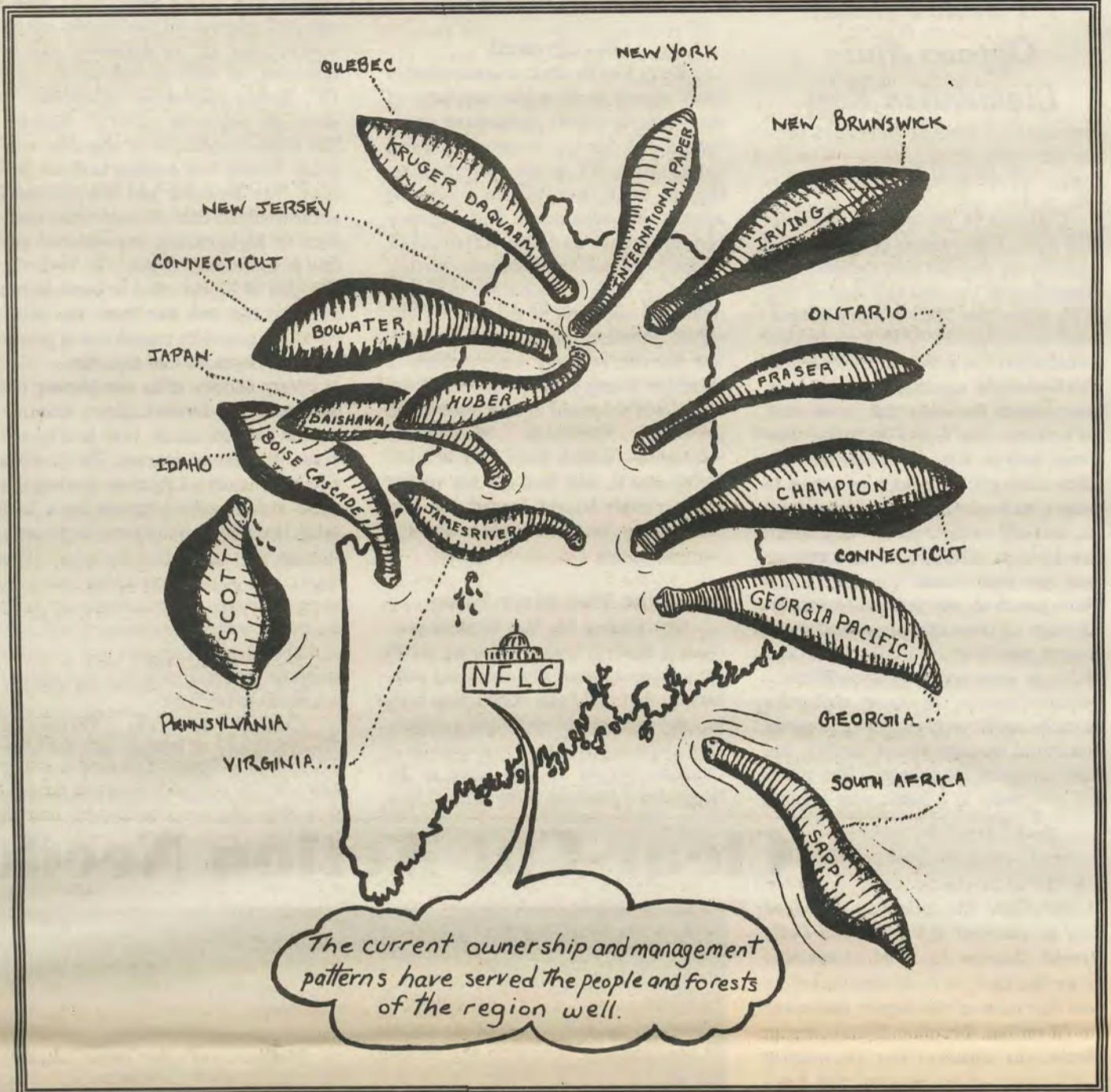
Mainstream writers, the editors contend, find non-modern societies, with their poverty and high population growth, to be a major cause of forest destruction. These writers advocate the imposition of modern managerial systems, such as scientific forestry, as the solution. The editors of this book find that such “solutions” are part of the problem. They argue that the local systems of knowledge should be part of the solution.

The most “modern” of the case studies was Maine. The author of this section, David Vail, an economist at Bowdoin College, concludes that “the dominant system of knowledge in Maine forestry...stands as a warning rather than a model to Third World nations.” Oddly enough Vail found Maine to have the lowest level of ecological and social consciousness due to the emphasis on other values of individualism, materialism, self-employment and independence, and a strong property rights orientation amongst workers and companies.

We see the contrast between a Hill Maria elder from India—“The sun, the moon, the air, the trees are signs of my continuity...I was born a part of the Bhum [the world of the Hill Maria]. I will die when the Bhum dies...”—and a logger in northern Maine—“I’m just a machine. I sleep, eat and work... I’m about the dumbest guy my wife’s ever met.” The more “primitive” conception embeds the person in a social and natural environment. The more “modern” one has the individual disembodied.

The editors conclude that forest reform rests on three major shifts:

- 1) political—decentralize and transfer power to local communities;
- 2) economic—question the imperatives of modern technology and chemicals and shift to more organic or appropriate methods;
- 3) cultural—give more weight to local,



non-industrial systems of knowledge, systems that have more connection and respect for nature and communities.

The section on Maine by Vail should be of special interest to those concerned with the northern forest. Vail gives a history of changes in logging technology, labor, and forest practices in the industrial forest. He cites figures of looming shortfalls for softwoods and declining quality in hardwoods. He describes the high accident rates, low wages and evidence of exploitation of workers and gives an account of the Maine Woodsmen Association uprising in the 1970s. And he discusses the “technical fixes” to these problems, such as mechanization, whole-tree harvesting, and biomass markets.

Vail writes, not only about the failure of the woodworkers uprising, but also about the failure of environmental groups to join with forest workers to reform forestry in the state. While in Europe, the Green parties have comprehensive social, economic and environmental agendas, “Maine’s environmental organizations have paid little heed to the material concerns of working people and have been limited to a typical American single-issue politics.”

Vail believes that part of the reason for this difference is that, in general, the most influential conservationists accept basic capitalist premises that “land is a commodity, profit is a valid human motivation, and market competition is a useful mechanism governing social relations and relations between humans and nature.” He mentions, in this

regard, that “Maine Audubon Society, in particular, has been compromised by the presence of paper company executives and scions of landowning families in its leadership and by its reliance on corporate financial contributions.”

Vail concludes by comparing Maine’s situation to that in Finland (which is covered in a previous section). While Finland certainly has its problems, according to Vail it also has much more of a sense of long-term stewardship, as contrasted to Maine’s “mining and neglect.” The government is much more involved, and workers have been better treated. There are actually legal restrictions on corporate ownership and thus most of the land is in the hands of Finnish smallholders. There is more of a sense of common property notions. Foresters have a high level of respect and status.

“Finland,” he writes, “may not be a

paragon of humane and ecologically sound forestry. Yet, compared to Maine, its system of forestry knowledge appears to have served social and environmental ends rather effectively.”<sup>1</sup>

Although the book was published in 1993, Vail’s section was written in 1988, and thus misses a half decade of major change in Maine and Finland. Still, the book is useful for both its historical and its cross-cultural perspective.

—Mitch Lansky

<sup>1</sup> According to the July, 1994 issue of *Taiga News*, “The forest management practiced in Finland during the past few decades has caused serious damage to nature and biodiversity.” The article identified some practices that are especially damaging to biodiversity:

- \*logging that disturbs the natural continuity of forests, such as seedling cuttings and large clear-cuts;
- \*drainage of swamp forests and wetlands;
- \*monotony of forest structures and tree species;
- \*soil scarification.”

The article said that a working group has been established by the government to develop an environmental programme for Finnish forestry—an admission that all is not well.

## Income Opportunities in Special Forest Products: Self-Help Suggestions for Rural Entrepreneurs USDA Forest Service Agricultural Information Bulletin 666

Summary: “For many rural areas, the path to sustainable economic development will include innovative approaches to natural resource conservation, management, and utilization. This publication describes special forest products that represent opportunities for rural entrepreneurs to supplement their incomes. The types of products discussed in this publication include aromatics, berries and wild fruits, cones and seeds, forest botanicals, honey, mushrooms, nuts, syrup, and weaving and dyeing materials. Each chapter describes market and competition considerations, distribution and packing equipment needs, and resource conservation considerations, and presents a profile of a rural business marketing the products. In general, products suitable for very small or part-time operations are described. A suggested role for each type of micro-enterprise within a broader rural economic development framework is also mentioned. Each chapter concludes with a list of contributors and additional resources.”

# Cut & Run Logging by Property Rights Zealot Threatens Mad River Valley

## VT State Forester Opposes Anti- Liquidation Regs

by Lowell Krassner

Citizens in the central Vermont Mad River Valley towns of Fayston and Duxbury are aroused over a classic 19th century-style cut-and-run timber sale (with some late 20th century adaptations) scheduled for 9200 acres in their communities. At a November 3 meeting which brought together state officials, independent foresters, the landowner, his foresters, the Canadian timber purchaser, and an array of concerned residents, they got little hope of action to protect their communities' forest from an action that most deplored. Government officials told them there were few legal means to require sound forest practices and refused to support adoption of rules that are necessary to prevent repetition of similar problems. Although press reports had headlined a monster clearcut, the owner outlined a far more insidious highgrading program that could damage forest quality and wildlife habitat for decades. This action will contribute to a battle over logging

practices in the next legislature.

### Background

Keith Van Buskirk, characterized in press reports as an ardent supporter of the property rights movement and a John Birch Society member, lives in Queensbury, NY in the Adirondacks. He has been involved in a lawsuit against the Adirondack Park Agency (government) and the Adirondack Council (private environmental group), asserting they violated his property rights. An opponent of the recently dissolved Northern Forest Lands Council, Van Buskirk in many ways presents a paradigm example of the problems the NFLC was supposed to help resolve. He operates American Wilderness Resources, which buys forest land, highgrades it, and then quickly resells it. He recently bought, logged, and sold a 2000 acre tract in Windham County, Vermont within a six month period.

### In the Mad River Valley

On October 11, Van Buskirk purchased several tracts, totaling 9200 acres, from a financially distressed partnership that had been conducting both forestry operations and land subdivision. Timber rights were sold to a Canadian logger. As described at the November 3 meeting, there will not be a

clearcut over all the forest, but a "diameter cut" wherein all hardwoods, except beech, over 12" in diameter will be removed, as will all softwoods over 10". Spruce plantations established 50 years ago are to be cut to 8" diameter. The likely destruction of vital deer wintering habitat was evident to those present. Van Buskirk and his foresters acknowledged that diameter cuts are a form of highgrading, but asserted that this is traditional forestry in Vermont. The gist of highgrading is summarized as "take the best and leave the rest." Foresters generally regard it as a procedure that degrades forest quality.

Very shortly after completing the purchase, Van Buskirk began advertising the land for resale, both locally and in the *Wall Street Journal*. The land for sale is, of course, subject to the logging rights already sold. Vermont has a land sales tax which penalizes short-term speculation. The price for which Van Buskirk is advertising these lands is, however, below his purchase cost, with the profit margin contained in the sale of timber rights. It appears that a serious loophole in Vermont's anti-speculation law needs to be fixed.

Conrad Motyka, Vermont's Commissioner of Forests and the state government representative on the NFLC, was present to answer questions

about the government's role in this issue. He stated that the actions planned were contrary to Vermont's preference for forests managed under long-term stewardship, but noted that except for logging at elevations above 2500 feet, there is no Act 250 review, and Vermont has no general forest practices regulations. According to Motyka, water quality rules do apply to stream sides, and should protect aquatic habitats, regardless of elevation.

Leo Laferriere, a former Commissioner of Forests who had also served at times over the past 20 years as forester for the partnership that formerly owned the lands, gave eloquent criticism of Van Buskirk's short-term highgrading scheme, and seemed to regard it as a particular loss to the lands for which he cared.

### Threads of Hope?

Two potential legal glitches which could provide a measure of influence over the logging plan have surfaced: at one time the previous owners had applied for an Act 250 permit to subdivide one of several abutting parcels in the purchase. This parcel also abuts Camel's Hump State Forest, whose protection was a significant reason for the

*Continued on page 31*

## Clear-Cut Action Needed

*Ed Note: The following, abridged from an editorial of the Rutland Daily Herald, October 12, 1994 is reprinted by permission. It is disappointing to note that none of the papers that cover the Northeast Kingdom has chosen to speak out against the incredible destruction of our forests. See back cover for a map of Lunenburg, Vt clearcuts.*

More information is emerging about the extent of logging operations underway in the Northeast Kingdom, and it is time state government recognizes the potential dangers to the economy and the environment of heedless and widespread clear-cutting.

Could the logging in the Northeast Kingdom be called heedless? Nobody knows for sure because nobody keeps track in a systematic way. But according to those who have driven through, flown over and taken a look, huge swaths of land are being deforested.

A recent study has found that a quarter of the entire land area of the town of Concord has been clear-cut since the early 1980s. In some places thousand-acre parcels are being stripped bare. . . .

A thriving timber industry is also important for the economic health of the Northeast Kingdom, where unemployment is high. Vermont's natural resources, including our forests, ought to be used in such a way that they support our economy and strengthen the rural way of life that Vermonters cherish.

But when the clear-cutting of forests reaches a certain magnitude, all of this changes. When a vast expanse of forest is laid bare, regeneration of high-quality timber is much more difficult, foresters say. In the meantime, erosion can ruin the land and waters of the region, and wildlife habitat will have



*This 1000-plus clearcut on the side of Kirby Mountain in Vermont's Northeast Kingdom could have been prevented if only the logger and landowner had "voluntarily" curbed their greed. Alas, Vermont state officials have permitted industry pressure to paint them into a corner by opposing all forest practices in favor of "voluntary" adherence to responsible forestry. Next time your house catches on fire, urge the fire to voluntarily put itself out. Photo courtesy of Vermont Natural Resources Council.*

been destroyed.

Rapid deforestation also sets up the region for a dangerous boom-and-bust cycle that, in the long run, could do considerable damage to the economy. The unemployment that has plagued the timber industry in the Pacific Northwest is only partly due to the spotted owl or other environmental concerns. Rapid removal of the forest resource has brought the timber industry there closer than a lot of loggers might wish to depletion.

If short-term economic gain were the desired goal, Vermont could strip

itself bare as it did in the 19th century then wait amid the puckerbrush for the forest to return 100 years later. There would be jobs in timber for awhile, then they would be gone. Such a cycle would be akin to the overfishing that has depleted the fisheries of the North Atlantic and undermined the New England fishing industry.

But even in the 19th century when 80 percent of the state had been logged, the removal of trees occurred a little at a time without the damage to land and waters that large-scale industrial-style timber harvesting can cause. . . .

In the meantime, the trees are falling and no one is hearing. The Department of Forests, Parks and Recreation was going to take a look, but in recent years, it has not been politically convenient for the state government to take an activist role on environmental issues. That is the role it ought to take now. The state needs to assess the pace and the potential dangers of the logging under way and to respond. This would be done, not to endanger jobs in the logging industry, but to preserve them.

# More Tree Talk: The People, Politics, and Economics of Timber

by Ray Raphael  
Island Press 1994

For those interested in the debate over forest policy in this country, *More Tree Talk: The People, Politics, and Economics of Timber* by Ray Raphael is a must read. The book is important not only because of its readability and breadth, but also because Raphael lets much of the discussion come directly out of the mouths of those who have worked intimately with the forests of the Northwest, rather than solely through his interpretations.

Raphael uses this monologue technique to introduce us to the history of logging in the northwest, the logic behind industrial forestry, and critiques of industrial forestry. He has his protagonists discuss silvicultural systems, logging technology, the different forms of forest ownership (public, private, and industrial), and the impacts of forest policy on local communities.

Raphael weaves these monologues together with his own comments. Although he is "objective" in providing somewhat of a balance of voices, his own voice is unashamedly biased towards what he calls "holistic forestry." Holistic forestry strives to maintain ecosystem processes by doing minimal disruption during management.

The industrial model, based on large roads, heavy equipment, clearcut logging on steep slopes, herbicides, and monoculture plantations, clearly fails to meet Raphael's holistic criteria. It lowers forest productivity, damages forest soils, disrupts essential soil life processes (such as the role of fungi), and leads to stands susceptible to insect, fire, and disease problems. It also is causing devastating effects on local communities as people are replaced with machines, wood runs out, or cutting is halted due to threatened endangered species.

While he is no fan of industrial clearcuts, he has reservations about widespread reliance on selection due to problems (admittedly connected with abuse) such as excessive roads, logging damage to residuals and regeneration, and damage to root systems from heavy equipment. For him, holistic forestry would use the method (clearcut, shelterwood, or selection) most

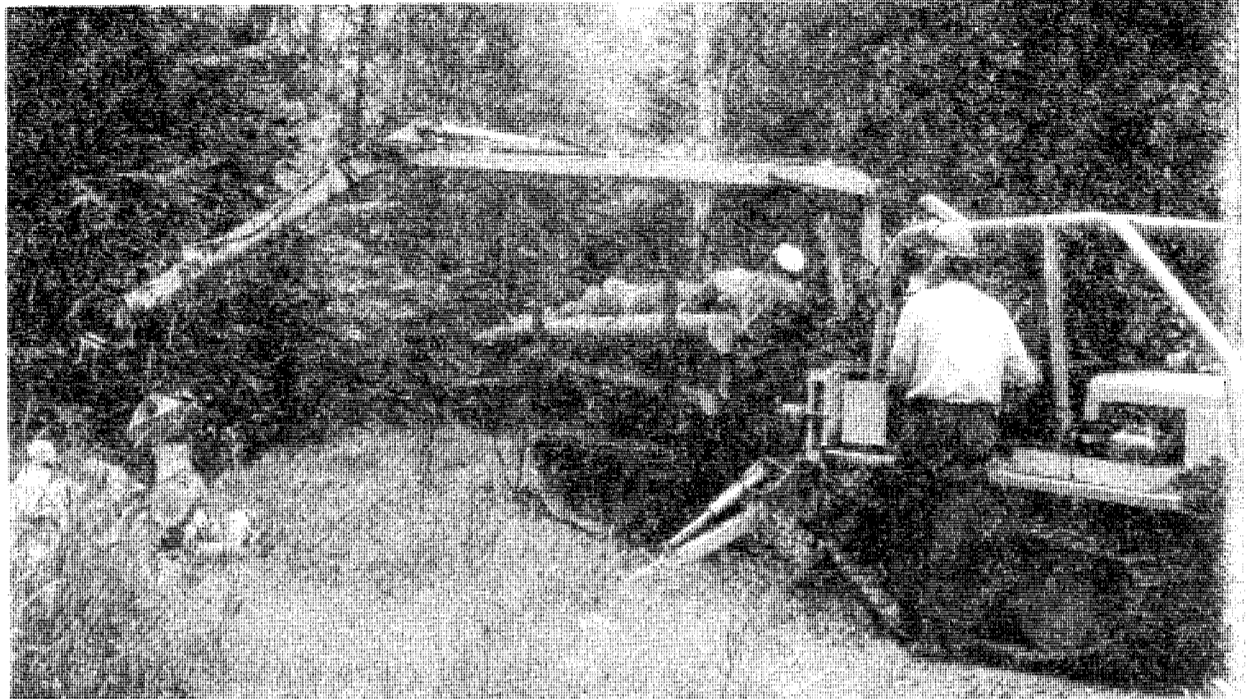
appropriate to a given site and to the landscape.

He is equally skeptical of industrial ownership of timberland. Because the companies are concerned with maximizing returns on their investments in a world of discount rates and competing investments, they end up, ironically, lowering forest productivity by cutting trees well before biological maturity. Due to the insidious effects of interest rates pitted against tree growth, "Private enterprise," he writes, "operating according to economic necessity, is simply not suited to the job of producing the most and best timber products."

Some of the more interesting sections of the book are the those where practitioners of more benign forms of forestry discuss their experiences. Dr. Rudolf Becking, a forestry professor emeritus at Humboldt State University, for example talks about how the Swiss all-aged management system evolved, and how it has worked for generations in a culture where forest stewardship is ingrained.

As Raphael comments afterward, "The Swiss system is, in a word, *personalized*. The foresters and forest workers are dealing with individual trees on limited forest land, not with large, anonymous tracts of raw timber. There is no financial reward for liquidating resources; indeed, the professional standards are based on how well regeneration can be accomplished. The forest is seen as a complete entity that grows timber, nourishes wildlife, stabilizes hillsides, provides water, and serves the recreational needs of human beings. The forester is the caretaker—but not the owner—of this entity. He is a 'ranger' in the old-fashioned sense: a keeper of the woods, a steward of the land. As a public servant and an elected official, he is charged with the task of maintaining a healthy, balanced, and productive forest."

To Raphael, such a system is a living example of holistic forestry.



Sam Brown, shown here loading logs onto his forwarder, practices low-impact forestry in Maine. See *The Northern Forest Forum*, vol. 3 #1, pages 26-27. Photo by Mitch Lansky

## Cut & Run

*Continued from page 30*

denial of the application. The legal question of whether this should bring the logging on all contiguous tracts under Act 250 review has not yet been resolved. [Ed. Note: In late November, the state joined the Vermont Natural Resources Council in calling for an Act 250 review.]

Perhaps more significant, town roads have a 24,000 pound weight limit, which requires a special overweight permit to allow heavier logging trucks to use them. This could provide the towns leverage to set some conditions on logging practices.

## Remedies Needed

Despite their vehement disapproval of the logging plan, both Motyka and Laferrriere opposed state regulation of forestry. Advocates of voluntary training, they have no answer for the problems posed by an operator who will be gone in four years, or for a timber purchaser from Canada, without any long-term interest in Vermont forests. The growing outcry against massive clearcuts in the Northeast Kingdom, this example of avoidance of the land gains tax, and the instance in southern Vermont several years ago, wherein a deer yard protected from destruction by denial of an act 250 permit was subsequently clearcut without any legal recourse, all point to the need for stronger laws to preserve sustainable forestry and protect habitat.

Voluntary cooperation is the most desirable course, but clearly it doesn't

work when owners have no long-range stake in the land. Highgrading and clearcutting are an unsustainable tradition that have degraded Vermont's forests for too long, and the public will not accept them any longer. As the NFLC should have learned from its listening sessions, the public is demanding reform, and will seek new laws to enforce that reform.

One proposal would empower individual communities to set standards for silvicultural practices under their zoning authority. The varying provisions of individual codes set by each municipality, together with the difficulties of determining which town's code applies at a particular spot in the woods, where boundaries may be unclear, makes this idea appear very inefficient. The costs of trained personnel to assure compliance would be an added inefficiency. Also, provision of forestry rules under zoning powers would seem more likely to keep zoning board agendas full with variance requests rather than to accomplish real conservation and sustainability objectives.

One of Commissioner Motyka's principal objections to being assigned a forestry enforcement role was fear of the effect upon the department's budget and its other programs. Funds for a forest practices program could, however, be raised by a severance tax on timber harvest that replaced, at least in part, the property tax burden that timber owners currently complain about. Such a severance tax, currently in use in New Hampshire, could be scaled to the intensity of the logging, and might also help make up for the land gains tax that is

being avoided in the Mad River Valley. Certainly it makes tax costs more nearly concurrent with income from forestry, answering a problem that some claim is a reason for poor forest practices.

There are many possible ways to deal with silvicultural malpractice, a problem which the public has recognized and for which it demands a

response; the one unacceptable course is further delay and inaction from the state. Voters will have to make that very clear to their representatives and the Governor as the Legislature convenes.

Lowell Krassner of South Burlington is a longtime grassroots activist with the Sierra Club.

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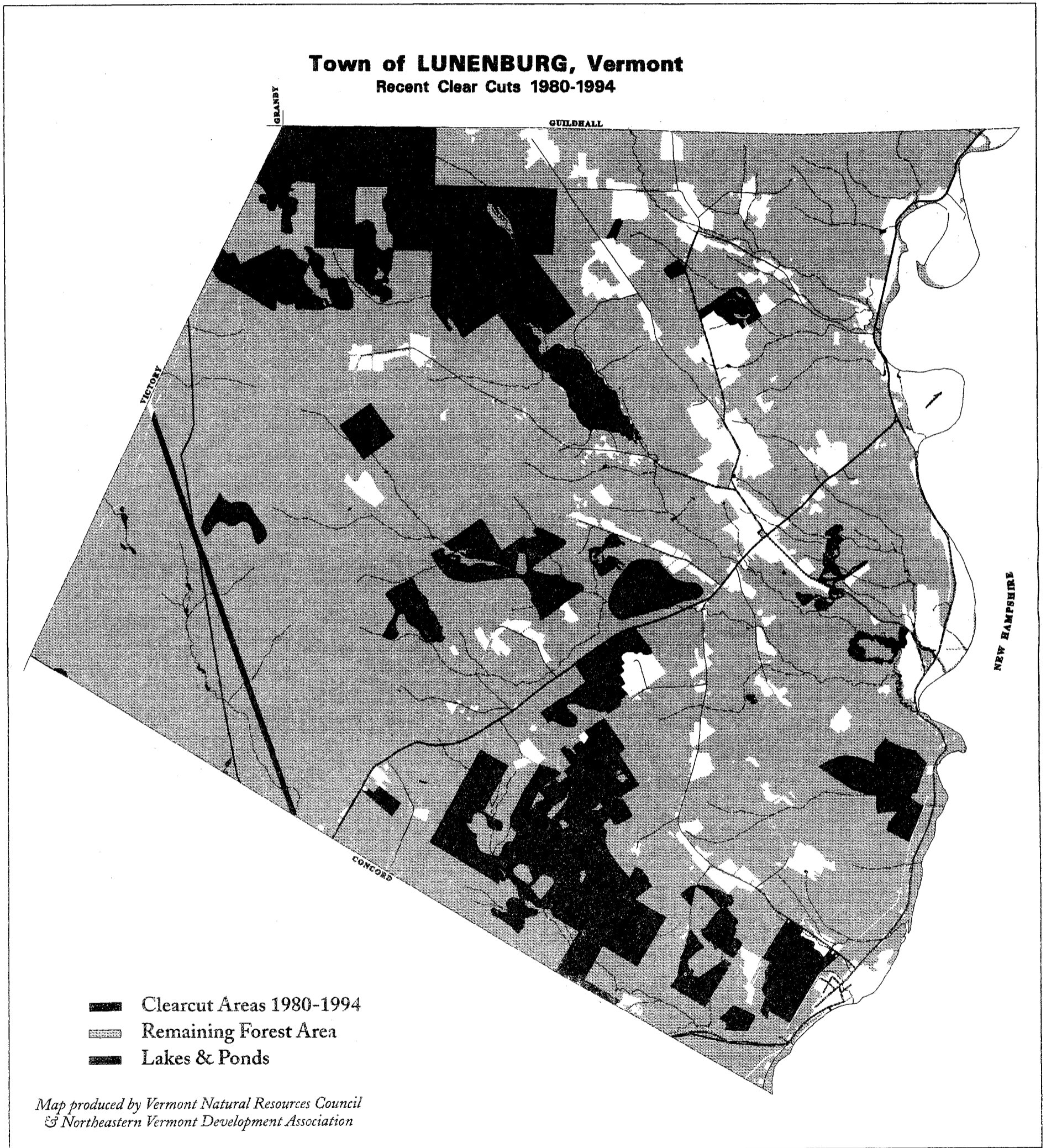
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# Vermonters Your Government Refuses to Stop Forest Liquidation!

*Over 18 Percent of Lunenburg has been clearcut since 1980*

And Still the State Assures Us That Voluntary Forestry Guidelines Will Protect the State's Forests



Property Rights Zealot & Forest Liquidator Keith Van Buskirk Plans to Highgrade 9000 Acres in Fayston and Duxbury  
(See Article on Page 30)

**And Still the State Opposes Regulations Designed to Halt Forest Liquidation**

*Write Governor Howard Dean, State House, Montpelier, VT 05602 and Demand that the State Stop Forest Liquidation Now*