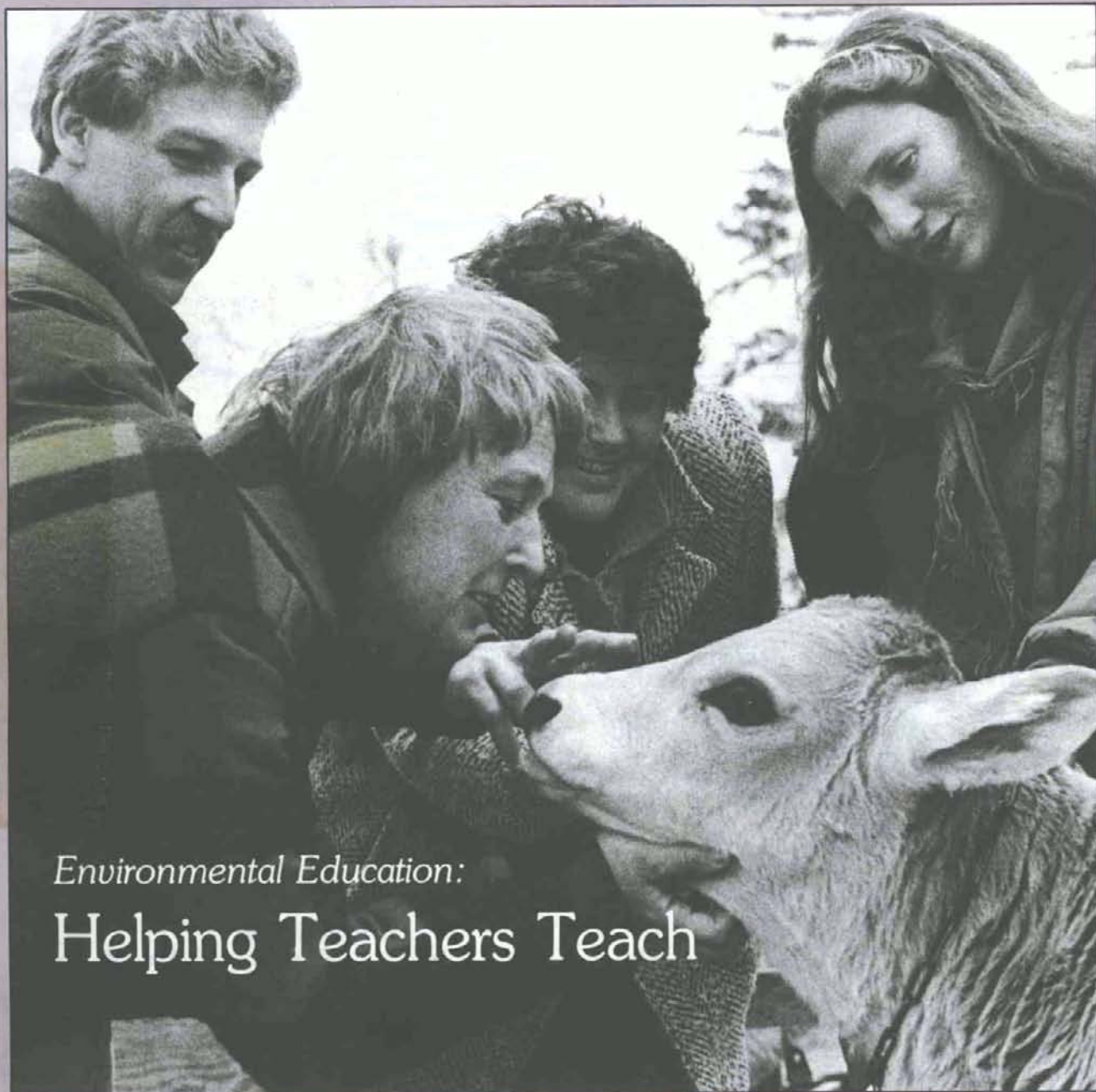


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Vermont Natural Resources Council

Spring, 1987



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# Vermont Environmental REPORT

Spring, 1987

*Published by the Vermont Natural Resources Council*

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The Vermont Natural Resources Council is a non-profit environmental organization working to promote the wise use of Vermont's natural resources. The Council does legislative lobbying, research, and educational work on a variety of issues including forestry, agriculture, water, energy, hazardous wastes, and growth management.

VNRC is the Vermont affiliate of the National Wildlife Federation.

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## FROM THE FRONT OFFICE

In Vermont, first it was  
"Coloradification"; now is it  
"Floridification"? The following is  
excerpted from an article by Gary  
Blonston called "Growth Clouds  
Future of Sunny Florida," which  
appeared in the March 8 *Sunday  
Rutland Herald/Times Argus*. See  
if it rings true to you the way it  
did for me.



"Finally, Florida is grappling  
with an attitude problem.  
Whether people come to the state  
to get warm, make money or  
stretch their retirement nest egg,  
many new immigrants to Florida  
are seen as not having much at-  
tachment to or stewardship about  
the places and people around them.

"As outgoing Democratic Governor Robert Graham has said, 'this failure to make an emotional transference—to feel that what we have shaped is something that we're going to have to live with— promotes a sense of irresponsibility.'"

Another former Florida official, Nathaniel Reed comments: "If you look back to where we were in 1967 and where we are twenty years later, you would have to say, 'you guys have done some wonderful glorious work; but we've...allowed such urban sprawl— one strip city after another to a degree unimaginable. There's no more character. The individuality of the cities has been lost. They're all the same.'"

"To address that sort of rampant expansion, Graham pressed the legislature to pass a package of statewide growth management laws in the last three years, essentially to permit development only when it is in harmony with state-approved local growth plans, available infrastructure and the welfare of nearby land and people.

"Some might say the law is ten, twenty, thirty years too late. One is DeGrove, a former Graham cabinet member who helped spearhead the drive for the growth bill. He remembers the years before that with regret.

" 'We went along in a fool's paradise,' he says, 'thinking that growth paid for itself... that it was all going to catch up. It wasn't until the late '70's when we realized that, given Florida's tax structure, every time a new person came to the state we got a little more in the hole.'"

"Even Florida's public began to notice. 'People got scared about all that growth,' he says. 'A lot of people who don't give a damn about the environment still can get very upset about sitting in traffic.'"

"Whether over groundwater or gridlock, that broad awareness made the growth-management legislation politically acceptable."

The issue is clear, and the solutions are graspable. The question is simply whether we will learn *now* from the sad experience of others, or—too late—from our own.

Sincerely,

Monty Fischer

R. Montgomery Fischer, VNRC  
Executive Director



## Responses to Parcelization

Dear VNRC:

Please send me Susan Hamilton's full report, "Corporate Land Speculation in Vermont: A Profile of Causes, Environmental Impacts, and Case Examples of the Rapid Subdivision of Rural Vermont Land."

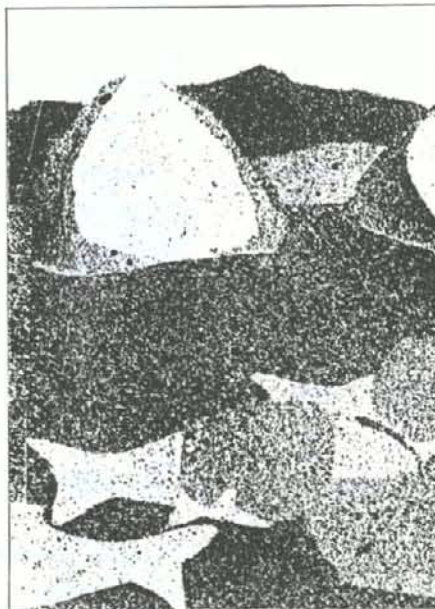
I am both a concerned landowner in Vermont—who expects to retire in Vermont this year—and a member of VNRC.... I own a parcel of land (approximately 160 acres) in the towns of Strafford and Vershire in Orange County, and am somewhat worried as to the future of land values and taxes in these two towns....

Susan Hamilton's article in the Fall 1986 *Vermont Environmental Report* is most disturbing. It was our hope that our area would retain its rural aspect....

Herta A. Harisch

Thanks to all of you who wrote to us about our report on "Parcelizing Vermont." We have been impressed and deeply gratified by the response that our research prompted from members, as well as from town and regional planning commissions, selectmen, other municipal officials, and many more concerned Vermonters.

VNRC's report also triggered action at the Vermont statehouse. At press time, a VNRC-supported bill aimed at slowing land speculation had received strong support from House committees and was pending floor debate. H. 383 would eliminate the "five-mile-radius loophole," instead requiring that speculators who create many subdivisions within the



same Environmental District come under the jurisdiction of Act 250. In addition, the bill would strengthen the Land Gains Tax as a deterrent to land speculation, through differential tax rates on land bought, subdivided and re-sold within six months or one year.

Clearly, "parcelization" represents a grave and immediate threat to Vermont's way of life through its effects on rural land values and use, municipal services, wildlife, recreation, and more. We are working to create the tools necessary to slow the trend now, before it's too late. SC

## Damming Great Falls

Great Falls, on the main stem of the Ompompanoosuc River, is the subject of controversy that has divided the small community of Thetford Center.

At issue is a private developer's proposal, currently before the Federal Energy Regulatory Commission (FERC), to restore a

breached dam to its former height, place a buried penstock on the west side of the stream below the 45-foot-high cascades, and build a power house to produce 300 kilowatts of electricity.

The Great Falls case marks the first time that the Vermont Department of Water Resources has refused a water quality permit—a permit that the developer needs in order to proceed with the FERC process—on aesthetic grounds alone. The denial is currently being appealed to the Water Resources Board.

The State received an unprecedented amount of correspondence from local citizens and people familiar with the site opposing the proposed project. The Friends of the Ompompanoosuc, now a formalized group, petitioned FERC to deny a preliminary permit in 1985 and is now party to ongoing Water Resources Board hearings.

Questions will focus on whether the Department may include recreational and aesthetic values which exist adjacent to the water in the evaluation of the project. The Department maintains that courts, as well as the federal Environmental Protection Agency, have ruled that aesthetics may be a criterion if they relate in some way to water quality.

The developer, however, argues that matters "out of the water" do not come under the jurisdiction of Vermont's Water Quality Standards.

Opponents of the hydro project note the unique juxtaposition of the village center to the Falls and the Historic Sayers Bridge, a covered bridge built sometime after 1839. A large hydro project would, maintain opponents, affect the quality of the river, and in this way brings the case under the Water Quality Standards.

"The project vicinity is a classic Vermont townscape," says Stephen B. Sease, Director of Planning for the Agency of En-



## VERMONT PERSPECTIVE

vironmental Conservation. "Such townscapes are valuable not only to the quality of life in Vermont, but to Vermont's continued economic health for tourism.

"The intrusion of a modern industrial project into the setting at Great Falls will be unduly intrusive to the character of the area," he adds. Often used as a recreation area, the land on both banks is publicly owned.

River advocates are keeping a close eye on Great Falls. Whatever its outcome, the case clearly demonstrates Vermont's need for adequate tools to protect river values—not only ecological, but also recreational, scenic, historic, and cultural.

*Shelly McSweeney*

*Shelly McSweeney is Legislative Liaison for the Lake Champlain Committee.*

### Another Hatchery Hurdle

The proposed Kingsland Bay Fish Hatchery, many years in the planning and the subject of much controversy in the conservation and sportsfishing community, crossed one of many regulatory hurdles this spring. Vermont's Department of Water Resources issued a water discharge permit for the project, authorizing an 11.5 million gallon per day discharge of settled, chemically-treated effluent.

The proposed hatchery, supported by key sportsfishing groups, is designed to produce 260,000 pounds of trout, salmon

and steelhead stock; approximately a third of the fish would be released into Lake Champlain, with the others being released in various streams and lakes across Vermont.

At permit hearings, which were held in June, 1986 and January, 1987, VNRC asked specific, technical questions on the potential effects of phosphorous-laden hatchery discharges to Lake Champlain's Hawkin's Bay. Areas of concern to VNRC included the Department of Water Resources' chosen ambient water quality standard, the wind, wave and circulation models, and the Department's planned response to long-term lake eutrophication. (See "Department Hatches Hatchery Plans," *V.E.R.* Summer 1986.)

After study this fall, the Department provided answers to the Council's questions which, says VNRC Executive Director R. Montgomery Fischer, "satisfied VNRC that the permit met the legislative intent of the state's water pollution control act."

The Burlington-based Lake Champlain Committee (LCC) also raised questions, some of which were not answered to their satisfaction, specifically on hatchery design and in-lake limnological calculations. LCC, along with the Town of Charlotte and several private citizens, has appealed the permit to the Water Re-



Photo: Sandy Millers

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sources Board.

VNRC emphasized in letters to Fish and Wildlife Commissioner Stephen Wright and Water Resources Commissioner Jonathan Lash that hatchery discharges must be closely monitored. And the Council called for an overall data base on lake water quality. "Serious research is necessary to investigate long-term changes in water quality, biological composition, and overall demands on the lake," said Fischer.

Still to come, before the state can expect to break ground on the proposed facility, are review processes such as Vermont's Act 250. An Environmental Assessment may also be called for, under the requirements of the National Environmental Policy Act for projects using federal money; and approval from the National Park Service will probably also be needed. SC

## Digging Deeper on the Gravel Controversy

Gravel pit operator H.A. Manosh can still remove truckloads of gravel from his pit in Morrisville; neighbors continue to complain about the noise and environmental disruption; and hearings continued into May on the H.A. Manosh Corporation's application for an Act 250 permit to expand the gravel mining operation.

Manosh was required to apply for the permit this winter after the Vermont Environmental Board discovered that the corporation had vastly exceeded previously-set gravel extraction limits. In addition, Manosh applied for a permit for a new pit adjacent to the existing site. (See "Digging Up Trouble" and related

articles, *V.E.R.* Winter 1987.) The Manosh case is a prime example of the gravelling problems that exist statewide, caused by an Act 250 "grandfather clause" which has allowed continued, un-reviewed gravel extraction from pits that pre-existed Act 250.

The gravel removal rate currently allowed is set at 10,000 yards per year, but Manosh's expansion proposal is extensive. The corporation would extract up to 150,000 cubic yards of gravel per year over a 30-year period—the equivalent of 25,000 truck trips per year, with a loaded truck leaving the site every three minutes.

VNRC has joined with Manosh's neighboring landowners—nursery owners Don and Lela Avery, Ten Bends Association, and several families in Cady's Falls—to gain party status in the case.

At stake is the water quality of the Lamoille River, which borders the pit and which receives siltation due to gravelling. The Lamoille is now actively managed by the Department of Fish and Wildlife, and sportsfishing enthusiasts are alarmed at the pit's potential effects on the fish population.

Neighbors argue that the quality of life and integrity of the farm and forested landscape are seriously threatened by the pit. And noise pollution experts have

testified that the many heavy trucks passing by the Averys' home are loud enough to damage residents' hearing.

Gravel is a necessary component in all road-building and development, and the environmental conflicts inherent in gravel mining will not go away. Given the serious problems caused by gravel mining, however, VNRC and gravel pit neighbors are urging modification or scaling-back of such operations, and maintain that gravelling permits must be structured to guard the quality of the resources that Act 250 protects. SC

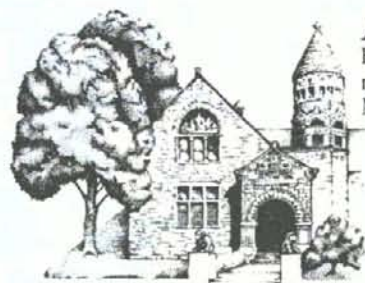
## Our Vision, Our Choices

Many of Vermont's environmental conflicts, whether they be about condominiums, agricultural land, wildlife, or other issues, come down to one tidy question: "Is this what we want here?"

Although difficult to answer under the best of circumstances, the question often becomes hopelessly complex when it is posed too late—when land has already been sold, personal plans have been developed, and money has already been invested. Development issues become fragmented;

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## VERMONT PERSPECTIVE

lawmakers, municipal leaders, and even community members have difficulty connecting all of the parts and seeing the entire planning picture.

A group of legislators, planning professionals, and other concerned individuals has been meeting since January in an effort to come up with solutions to this planning dilemma. "Vermonters for Vision and Choice" has held weekly discussions on why it has been difficult to initiate effective planning—at all levels of government.

In addition to their weekly meetings, the group held public discussions on the topics of changes in Vermont communities, preserving Vermont's working landscape, creating a sustainable economy, and how governments can encourage self-reliance and cooperation. After hearing speakers on the topics, the

60-100 participants broke up into smaller groups to discuss the issues.

The findings of the working groups have been summarized, and are now available to the public. In addition, video tapes of the four sessions are available, with an edited thirty-minute version of the video being prepared for release this summer. "Vermonters for Vision and Choice" hopes to distribute or present the information this summer to interested groups statewide; gathering feedback from these presentations, legislators hope to return to the '87-'88 legislative session with enough input to draft legislation on the planning issues.

To obtain copies of videos and summaries, contact Anne Winchester at the Legislative Council, State House, Montpelier VT 05602, 223-2231. SC

June is Vermont Rivers Month 1987—time to join river lovers across the state in celebrating our rivers and in increasing awareness of threats to those rivers.

Vermont Rivers Month is our link to a nationwide effort organized annually by the Washington-based American Rivers Conservation Council (ARCC), a lobbying group devoted to rivers protection.

Over a dozen events are planned for Vermont Rivers Month, including a river forum on the Winooski, a fly-fishing demonstration on the Ottauquechee, white-water lessons on the Connecticut, and green-up on the New Haven. Governor Kunin will paddle a stretch of the White to proclaim June as "Vermont Rivers Month, 1987."

State and national Rivers Month events calendars are available as of May. For more information, contact Shelly McSweeney, Vermont Rivers Month Coordinator, through VNRC at 223-2328.

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### 1-800-FARMER-1

Vermont farmers who are in need of financial advice, legal help, or moral support in these difficult agricultural times now have a number to call. Toll-free 1-800-FARMER-1 is the Vermont Farm Advocacy Network hotline; it is sponsored by Rural Vermont and the Vermont Ecumenical Council, with funding help from Farm Aid.

The network of farmers and other volunteers helps find answers to farmers' legal and regulatory questions, offers basic financial information on topics such as loan refinancing, and refers farmers and farm workers to counselling and support groups.



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## VERMONT PERSPECTIVE

In addition to the hotline, the network has helped create farm advocacy groups in Franklin, Orleans and Addison counties. Farmers, clergy, social service providers and rural business people meet monthly to discuss and follow up on farmers' problems, as well as to hear speakers and plan other events.

"As much as possible, it's farmer-to-farmer contact," says Rural Vermont director Anthony Pollina. And whether it is a farmer helping another farmer do the books, or being a companion in court, Pollina notes that mutual support in rural communities is needed now more than ever.

Those wishing help or to offer services can call 1-800-FARMER-1. SC

### High Ratings for the Environment

"Vermont's environment is the dominant value in the state, and while all agree on the need for economic growth, this is secondary to environmental protection," according to a poll by the Massachusetts Becker Institute released this spring.

Commissioned by members of Vermont's business community, the poll covered a complex array of issues including Vermont business, politics, media, and environment; participants included dozens of legislators, regulators, business and environmental leaders, news media representatives, and five hundred Vermont residents chosen randomly.

According to the poll's "Findings In Brief," results revealed a perception of the business community as "out of touch with the public," "lacking strong environmental commitment," and

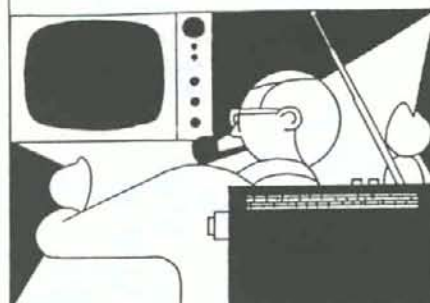
"divided and on the defensive." In contrast, environmentalists are seen as "confident of their political clout... scornful of business and its motives... possessed of some very extreme views," and preferring "confrontation to consensus." Poll results also showed Vermont regulations as slow in improving, and depicted a legislature that seeks consensus among business and environmental interests.

VNRC Associate Director Eric Palola, who was among the environmentalists polled, noted that Vermonters' emphasis on the environment was "rewarding but not surprising." In remarks to a March gathering of Vermont business leaders and others in the survey group, however, Palola questioned environmentalists' image as preferring confrontation to consensus.

Much of Vermont environmentalists' work centers on ensuring that existing laws be enforced, said Palola, and added, "Often, due to the colossal inertia that exists in regulatory and other institutions, and our system of checks and balances, it is necessary for environmentalists—or any advocate, for that matter—to call in what might be called 'the Ralph Nader Law of Physics.' The Ralph Nader Law says, 'It won't move unless you give it a solid push. Not just a mild push—but a jolt.'"

These factors may lead to a perception of preferring confrontation, said Palola, but he noted that these "battles" are the exception. Palola added, "I encourage the business community to get to know us—become familiar with our goals. We're all part of the same community of Vermont." SC

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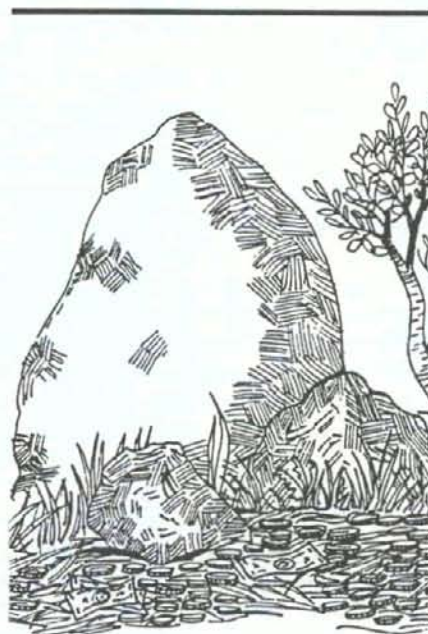
### *Problems With Vermont's Property Tax*

By Debbie Brighton

Noel Perrin, a part-time Vermont farmer and author, wrote an essay entitled "The Possibility Tax." He tells the story of a Vermont woman, employed as a social worker, who earned \$18,000 per year. When it came time for income taxes, the IRS sent her a bill for \$50,000. Thinking that there must be some mistake, she explained her situation and was told that the bill was correct; because she was a very attractive woman and could make \$100,000 working as a prostitute in Boston, she would be taxed accordingly.

His analogy to the property tax on farm and forest land is clear. We say that we want to preserve farm and forest land, yet we assess it and tax it as though it were being used for development, something that we say we want to control. Just as the woman's assessed tax of \$50,000 exceeded her income, the Vermont annual property tax often exceeds annual income from the land for agriculture or forestry. We don't want our taxation system to force the woman into prostitution, and we don't want it to force our agricultural and forest land into development.

In 1978 we established the Current Use Program to allow agricultural and forest land to be taxed based on its value for farming or forestry. Because this program addresses the most obvious problem, we tend to think that we have removed the obstacles that the property tax puts in the way of land use planning and the preservation of a working



landscape.

There are other ways, perhaps slightly more subtle, that our state tax structure inhibits our working landscape. First, because the property tax is so important to local government, towns are competing for industry, often at the expense of long range planning. Often the long term concerns of a sustainable economy and careful integration of the working landscape are forgotten in the more immediate search for tax base.

Second, the tax structure is not equitable. It's not equitable in that it taxes farming and forestry industries significantly more heavily than other industries. Even with the Current Use Program, we tax farm and forest land at about 2% of their value

for that industry. We don't tax other industries at 2% of their total value for producing their income—we only tax them at 2% of the value of their real estate and selected property. A large portion of the true value—the selling price—of most businesses, is attributed to their "good will," which we don't tax.

Not only is the system inequitable when comparing farming and forestry to other endeavors, but it's also inequitable when comparing farming to farming. We all realize that fair market value of a farm in Chittenden County will be significantly greater than the fair market value of a similar farm in the Northeast Kingdom, and so the Current Use program allows farmers to substitute a uniform value for an acre of productive pasture land regardless of whether it is in Shelburne or Barton. But even after we have equalized the assessment values of land through the current use program, the actual tax burden per acre can be seven times higher in one town than in another on the same quality land. This tax burden variation is caused by different tax rates, which are mostly caused by differences in tax base—or differences in the total value of other property in the town—not in differences in the economic viability of the farms.

These inequities are arbitrary handicaps given to many farming and forestry businesses before they can even begin to play.

When a college class talks



about the property tax, the students almost always feel that the tax should be thrown out. However, most legislators and other notables feel that the property tax is here to stay. I'm not sure what wisdom has been gained to contradict the students' intuitive approach, but there are a few myths which seem to contribute to the persistence of the current form of our property tax.

Many people feel that the Constitution established this tax. When people mention the constitutional basis for the tax, they usually refer to the equal protection and proportional contribution clauses of the U.S. and Vermont Constitutions.

Article 14 of the U.S. Constitution ensures that no state shall "deny to any person within its jurisdiction the equal protection of the laws."

Article 9 of the Vermont Constitution states that "every member of society hath a right to be protected in the enjoyment of life, liberty, and property, and therefore is bound to contribute his proportion towards the expense of



**"When a college class talks about the property tax, the students almost always feel that the tax should be thrown out. However, most legislators and other notables feel that the property tax is here to stay. I'm not sure what wisdom has been gained to contradict the students' intuitive approach, but there are a few myths which seem to contribute to the persistence of the current form of our property tax."**

that protection, and yield his personal service, when necessary, or an equivalent thereto...."

These articles have been construed to justify a poll tax (recently abolished) for the protection of life and liberty, and a property tax for the protection of property (not for education). They have also been construed to prohibit arbitrary and unequal classification schemes for taxation.

Another popular impression is that our current property tax system exists because we have always done things this way. We did establish a tax base, recorded in the Grand List, which primarily comprised property. According to General Walker who wrote in the Political Science Quarterly in 1888, "the New England people of the old stock were a saving people. Whatever was earned, beyond the necessities of life, was turned into property, and presumably the most remunerative kind of property." As such, property was an index of ability to pay, and as much forms a just basis of taxation.

But this Grand List didn't look anything like our current Grand List. Every type of property was listed in various categories: brass clocks, gold watches, other watches, pleasurable carriages, wagon with spring seats, money in bank accounts, money on hand, stocks, horses (which were valued according to their age), and so on. The town listers were also directed to list those who reckoned on their wits rather than their property at "not less than \$1 nor more than \$30 at the discretion of the listers."

The property tax is certainly not prescribed in our current manner and form by the Constitutions, nor was it always this way. Originally, we chose a property tax because it was a fair index of ability to pay, and it was logical because a large percentage of our taxes went to pay for the protection of property. In addition, we made every attempt to make sure that the property tax applied to everything that could be considered part of that index of the ability to pay—not just real estate.



**"The property tax is only a real estate tax. Because real estate currently represents only a small percentage of our ability to pay, a real estate tax should raise only a small percentage of our revenues."**

As is true in any institution, the property tax owes some of its invulnerability to the euphemisms which have grown up with it and which keep us from seeing what is really happening. Our property tax system assesses property based on its "highest and best use." A lofty term, but is that really what we are doing? And then, consider the phrase "fair market value taxation." We all want taxation which is fair, but in this phrase, the adjective "fair" modifies the noun "market," not "taxation."

Public taxation systems should reflect our values. At one point, the property tax system did this. At present, because of changes in the property tax and changes in society, the property tax contradicts many of our policies.

The Current Use Program is a start, but we have much farther to go. We need to change the tax structure so that:

- We reduce the incentive to towns to lure in industry simply to pay for education.
- We correct the perception of tax relief that tags the Current Use Program.
- We achieve greater equity in property taxes by sharing the tax base.
- We charge developers for some of the costs of development which are now reflected in the property tax. This could be done by imposing transfer taxes, exactions, or impact taxes to pay for local planning, sewer systems, recrea-



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tion areas, purchase of development rights, etc.

- We either add gold watches, lawyers' brains and other more modern manifestations of ability to pay such as sailboats and software to our tax base, or we recognize that the property tax is only a real estate tax. Because real estate currently represents only a small percentage of our ability to pay, a real estate tax should raise only a small percentage of our revenues.

Changes in the property tax cannot be expected to keep forest land productive or to keep farming viable. However, taxes are something we can do something about. Our tax system could be part of the solution; right now its part of the problem.

*Debbie Brighton is a forester, and is the former Vermont Current Use Program Coordinator. Brighton's commentary was delivered as a speech this spring to a gathering of the planning group "Vermonters for Vision and Choice."*

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Environmental  
Education  
Curriculum  
Supplements:

# Helping Teachers Teach

By Susan Clark

According to Megan Camp, Education Director at Shelburne Farms Resources, there are an awful lot of teachers in Vermont who are afraid of science.

"Unfortunately, lots of teachers hate to teach science. It is under-taught in many schools, because teachers are intimidated by it," says Camp; and she's backed up by the results of interviews that Shelburne Farms staff did with some fifty teachers of kindergarten through sixth grades statewide.

With backgrounds in general education, it is only natural that many grade school teachers view science as a foreign subject, full of lists, charts and test tubes. But Camp, and many other environmental educators like her, are helping teachers take a new look at the subject.

"It's obviously easier to teach and learn about things that you're familiar with," says Camp. So with "Life In A Lunchbox," "Habitat Lap Sit," "Mini-Beasts," "Adopt-A-Tree," and other provocative-sounding activities, a variety of environmental education curriculum supplements are

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## Tree Cookies

**OBJECTIVE**  
Students will be able to perceive time from the perspective of tree growth.

**ACTIVITY**  
Obtain a large cross section of a tree which has recently been cut. Using large map pins, mark the annual rings and connect by string to a bulletin board indicating important events in a particular year of the tree's growth. How large was the tree when the school was built? When the class entered school? When the last president of the United States was elected? When the students were born? Identify differences in sizes and spaces between tree rings. Discuss with the students various reasons for these differences (drought, lack of light, etc.).  
*Note:* The more sophisticated the class, the greater the time span that might be dealt with in this lesson.


**SUBJECTS**  
Social Studies  
Mathematics  
Science

**GRADES**  
K-6

**PLT PRINCIPLE**  
3. Cultural Contexts

**CONCEPTS**  
3.5 History and Environment  
3.25 Forest Influence on U.S. History

**SKILL**  
1. Gaining Information



**VARIATION**  
Using 2 to 3 inch (5 to 6 inch) section, ask students to count the rings. Explain that each ring equals approximately one year of the tree or tree limb, depending on where your tree section was located on the tree. Ask:  
• How old is the tree (or limb)?  
• Do we have a tree (or limb) as old as you?  
• How many rings would you have if you were a tree?  
• Is the cross section you have "more than" or "less than" the number of rings you are old?

**EXTENSION**  
Foresters often use a tool called an increment borer to extract a core of wood from standing trees, logs, poles, or timbers. Students could also take such cores for study. Using the technique of taking a core of wood, the age and condition of trees can be determined without destroying the tree. Students could also study such cores and analyze growth rate of trees or the penetration of wood preservative solutions on posts, pilings, or timbers. For information about the increment borer and suggestions for its use, write to: Forestry Suppliers, Inc., 205 W. Rankin St., Jackson, MS 39204.

**RESOURCES**  
A tree (or limb) cross section can usually be obtained from a local tree-trimming service, forest industry, or utility company that is clearing or trimming trees for power or telephone lines.  
See also PLT Resources section.

**Project Learning Tree: A joint effort of the Western Regional Environmental Council and the American Forest Foundation.**



aimed at making science fun, non-threatening, and teachable.

And the growing number of these supplements in Vermont and across the U.S. are doing more than encouraging high-quality science education. With creative, interdisciplinary "hands-on" activities, these new curriculum supplements are, in the minds of teachers and students, bringing the environment to life.

## The Learning Tree

One of the first environmental education curriculum supplements to be distributed nationwide just celebrated its tenth birthday in 1986; and it continues to be used, with renewed interest and enthusiasm, by Vermont educators statewide.

Project Learning Tree—or PLT, as it is better known by the over 80,000 teachers across the country who have been introduced to it—is a product of the Western Regional Environmental Education Council (WREEC) and the American Forest Foundation. As its name suggests, PLT uses the forest and associated resources as a vehicle to increase students' understanding of their environment.

Each of the forty states (and now, three countries) that uses PLT has a sponsor, usually a state agency. PLT first came to Vermont in 1981, thanks to the Vermont Department of Education's Science Education Consultant George Tanner. The program's base of operation was the Department of Education, with over 850 Vermont teachers introduced to the program. And this year, the Vermont Department of Forests, Parks and Recreation named the program as a priority in its new Conservation Education Section.

With two workbooks (for grades K-6 and 7-12) and over 160 combined activities, Project Learning Tree can not be purchased in stores or ordered from a publisher. PLT activities are, in fact, only available to those who have completed an approved six-hour training workshop in the program.

Ivy Frignoca is Conservation

Education Chief at the Department of Forests, Parks and Recreation and, with George Tanner, coordinates Project Learning Tree for Vermont. According to Frignoca, PLT training workshops will be offered this summer and fall. At a PLT facilitators' workshop this spring, about a dozen educators were paired with an equal number of Vermont foresters, to be trained in introducing PLT to teachers.



**With creative, interdisciplinary "hands-on" activities, these new curriculum supplements are, in the minds of teachers and students, bringing the environment to life.**

"PLT is a priority to us," says Frignoca, "because after all, without conservation education, what good is all the work we do in resource management? In order for our work to succeed, we need a citizenry that is informed and that cares about these resources."

According to Tanner, "PLT set a standard for a lot of the environmental education materials that came along later, and most of the newer ones follow a similar format." And the key differences that set PLT apart from other science education supplements of its time are what continues to make the program successful today.

Project Learning Tree—and other similarly-designed programs that followed it—are based on the ideas that through exploration and participation, education should encourage a student's awareness and appreciation of her or his environment. Education should also be relevant to issues

in the student's society, and should encourage each student to come to his or her own conclusions. In addition, just as all resources are interdependent, no subject stands by itself, and these interdisciplinary programs can be a thread to help integrate all subject areas.

More recent environmental education programs have improved on the accessibility and teachability of activities, but users of Project Learning Tree agree that PLT continues to act as a springboard for other environmental education activities. "PLT has inspired me to be more creative," says one Vermont teacher who uses the program. "And after attending the PLT workshop, I was ready and able to seek out some excellent, related educational materials."

## WILD In The Classroom

If imitation is the sincerest form of flattery, then the clearest signal of Project Learning Tree's success was the creation of its sister program Project WILD.

PLTparent WREEC contracted with the Western Association of Fish and Wildlife Agencies to develop Project Wild in 1980, and after development, field testing and revision, the first edition of WILD became available in 1983.

Wild uses the interdisciplinary, interactive, exploration and discussion-based approach set forward by Project Learning Tree. And just as PLT activities focus on forests, WILD's activities for K-6 and 7-12 use the wildlife theme to bring the environment home to students. The original Project WILD currently centers on terrestrial forms of wildlife; a new "aquatic supplement" to WILD is due out later this year to round out its content.

Now up and running in some thirty-five states, the national WILD network is similar to PLT's, with state sponsors offering teacher training workshops through which workbooks are distributed. In Vermont, WILD is hosted by the Vermont Department of Fish and Wildlife, and Education Director Mark Scott



could not be a more enthusiastic sponsor.

"Everybody knows that wildlife turns kids on," says Scott. "It's all around them; it's in their back yards—it's something they can relate to." And once WILD has caught students' attention, Scott says, the program "helps teachers integrate science, language arts, and other parts of the curriculum." Through discussion, role-playing, outdoor activities, and more, Project WILD "doesn't teach students *what* to think," says Scott, but "it helps teach them *how* to think."

Scott might get an argument on this point from certain anti-hunting groups. Project WILD has the endorsement of many wildlife groups such as the Na-

tional Wildlife Federation; but WILD made the evening news last year when animal rights organizations such as Friends of Animals and People for Animal Rights objected to Vermont's sponsorship of the program.

According to Fay Abbott, past director of People for Animal Rights, her organization opposes hunting, trapping, and the portrayal of animals as a "harvestable, renewable resource." Abbott notes that over half of WILD is, in the eyes of animal rights activists, appropriate for the classroom; but the groups maintain that the remainder of the project

is colored by the assumption that hunting and trapping are acceptable wildlife management tools.

Animal rights groups were included on Vermont's initial Project WILD task force, examining the potential use of the program in Vermont; but they did not succeed in convincing the committee not to accept WILD. The groups were also not satisfied with the changes made in the second edition of WILD; but Scott notes that before every new printing, WILD creators will continue to poll states for suggested changes.

Educators watching the WILD controversy note that Project Learning Tree suffered similar growing pains in its early days,

#### LEN OR LINDA OLS (COMMISSIONER)

You started your business ago. Your business is a difficulty relating to Thompson. Your real estate developing this property regarding the credit but you generally vote in

#### DAVID OR WANDA DRI (COUNTY COMMISSIONER)

You are 46 and own a furniture store. You like to sell furniture to all the people in the valley. You can also see the value in a natural and undeveloped area. You wonder if there might be a development of this housing

#### JACK OR JANET THOMPSON, JR. (COMMISSIONER)

You are the third generation to own the cattle company. You are proud that your grandfather was one of the first to settle in this valley. You spread out and you have grazing rights to all the forest service land. You resent the population of the area and, although involved in community affairs, you want to move into the area who do not value. Last winter, snowmobiles cut three times and in one case your cat onto the highway and caused a traffic

#### BOB OR BETSY HENDERSON, FARM (COMMISSIONER)

You own and operate a large farm near the edge of town and adjacent to the Bk in question. You have been interested in the possibility of buying the land to add to your family's agricultural operations. You're interested in the environment, making use of wildlife and minimizing damage to other resources. Since you are an adjacent land you may need to disqualify yourself from participation as a Commissioner in this me

### Materials

Options: props optional for role playing

### Procedure

1. Provide the students background information on the hypothetical land-use dilemma.
2. Thirteen students will be assigned roles as county residents, and business owners, etc. The rest of the students will be assigned roles as reporters, outside experts, etc. These students will be assigned the task of writing letters to the commissioners in support of their view: write news articles, personal impact stories, consequences for children, etc. Every student will be assigned either as one of the reporters or as one of the business owners. Prepare written articles.
3. To set the stage of the 13 participants. The other rule: they do not know each other. They should then be assigned their presentation or questions. Encourage the students to ask questions of each other. The participants will be assigned to the presentation or questions. Encourage the students to ask questions of each other. The participants will be assigned to the presentation or questions. Encourage the students to ask questions of each other.
4. The day after the presentation, the participants will be assigned to the presentation or questions. Encourage the students to ask questions of each other.

### Objectives

Students will be able to: 1) identify social and ecological considerations where human uses of land conflict with each other and with wildlife habitat needs; and 2) describe the importance of land-use planning.

### Method

Students role-play a meeting of a county commission pertaining to a land-use issue.

### Background

This activity uses a role-play strategy for study of the importance of land-use planning. It emphasizes the complexities of decision-making where people of different points of view are involved. The major purpose of this activity is for students to understand the importance as well as some of the complexities of land-use planning and decision-making.

### Background for Students

Land use decisions affecting wildlife have become a familiar issue where housing developments are concerned. The following is an imaginary conflict that corresponds to some real life dilemmas:  
Pleasant Valley is a ranching-logging community on the western slope of the Snow Mountains. Silverton—a town of 20,000—is the trade center of the area. Cramer Lumber Company is expanding its operations. This will provide 250 new jobs,

but housing is very limited. A 200 home subdivision has been proposed for an 80 acre plot of undeveloped land on the south edge of town. This forested area is bordered by Rattlesnake Creek on the west. Rattlesnake Creek provides excellent fishing for rainbow trout. Fifty-three species of birds have been sighted in this area, including some rare species. In the spring and fall, the area is used by migrating waterfowl and deer feed in the area. Many nongame species such as ground squirrels and pocket gophers inhabit this land. This 80 acre plot is currently zoned for agriculture and forestry and would have to be rezoned as residential by a vote of the county commissioners. The subdivision would be on a central water system, but each home would have its own septic system.

Age: Grades 6-9

Subjects: Social Studies, Science, Environmental Problems, Language Arts, Speech

Skills: analysis, application, comparing similarities and differences, description, discussion, evaluation, generalization, public speaking, reporting, research, synthesis, writing

Duration: three 45-minute periods

Group Size: large group; depends on students assuming roles

Setting: indoors

Conceptual Framework Reference: I.D., II.A., II.B., II.C., II.D., II.E., II.F., II.G., II.H., II.I., II.J., II.K., II.L., II.M., II.N., II.O., II.P., II.Q., II.R., II.S., II.T., II.U., II.V., II.W., II.X., II.Y., II.Z., III.A., III.B., III.C., III.D., III.E., III.F., III.G., III.H., III.I., III.J., III.K., III.L., III.M., III.N., III.O., III.P., III.Q., III.R., III.S., III.T., III.U., III.V., III.W., III.X., III.Y., III.Z., IV.A., IV.B., IV.C., IV.D., IV.E., IV.F., IV.G., IV.H., IV.I., IV.J., IV.K., IV.L., IV.M., IV.N., IV.O., IV.P., IV.Q., IV.R., IV.S., IV.T., IV.U., IV.V., IV.W., IV.X., IV.Y., IV.Z., V.A., V.B., V.C., V.D., V.E., V.F., V.G., V.H., V.I., V.J., V.K., V.L., V.M., V.N., V.O., V.P., V.Q., V.R., V.S., V.T., V.U., V.V., V.W., V.X., V.Y., V.Z., VI.A., VI.B., VI.C., VI.D., VI.E., VI.F., VI.G., VI.H., VI.I., VI.J., VI.K., VI.L., VI.M., VI.N., VI.O., VI.P., VI.Q., VI.R., VI.S., VI.T., VI.U., VI.V., VI.W., VI.X., VI.Y., VI.Z., VII.A., VII.B., VII.C., VII.D., VII.E., VII.F., 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L.G., L.H., L.I., L.J., L.K., L.L., L.M., L.N., L.O., L.P., L.Q., L.R., L.S., L.T., L.U., L.V., L.W., L.X., L.Y., L.Z., LI.A., LI.B., LI.C., LI.D., LI.E., LI.F., LI.G., LI.H., LI.I., LI.J., LI.K., LI.L., LI.M., LI.N., LI.O., LI.P., LI.Q., LI.R., LI.S., LI.T., LI.U., LI.V., LI.W., LI.X., LI.Y., LI.Z., LII.A., LII.B., LII.C., LII.D., LII.E., LII.F., LII.G., LII.H., LII.I., LII.J., LII.K., LII.L., LII.M., LII.N., LII.O., LII.P., LII.Q., LII.R., LII.S., LII.T., LII.U., LII.V., LII.W., LII.X., LII.Y., LII.Z., LIII.A., LIII.B., LIII.C., LIII.D., LIII.E., LIII.F., LIII.G., LIII.H., LIII.I., LIII.J., LIII.K., LIII.L., LIII.M., LIII.N., LIII.O., LIII.P., LIII.Q., LIII.R., LIII.S., LIII.T., LIII.U., LIII.V., LIII.W., LIII.X., LIII.Y., LIII.Z., LIV.A., LIV.B., LIV.C., LIV.D., LIV.E., LIV.F., LIV.G., LIV.H., LIV.I., LIV.J., LIV.K., LIV.L., LIV.M., LIV.N., LIV.O., LIV.P., LIV.Q., LIV.R., LIV.S., LIV.T., LIV.U., LIV.V., LIV.W., LIV.X., LIV.Y., LIV.Z., LV.A., LV.B., LV.C., LV.D., LV.E., LV.F., LV.G., 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and it was only after several revisions that the program ceased to reflect the harvest-oriented biases of its creators—the forest products industry. And environmental educators agree that the issues that PLT and WILD raise—whether they be the morality of hunting, the values of timber harvesting vs. wilderness, or the pros and cons of development—have a vital place in classroom discussion.

## Locally Grown

Vermont is well known for its strong environmental laws and regulations, so it should come as no surprise that our environmental education resources are also thriving. The past year has seen the publication of two striking environmental education curriculum supplements for grades K-6, both from leaders in Vermont

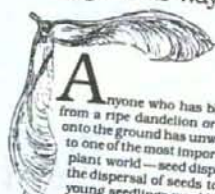
conservation.

Volunteers and teachers statewide are already familiar with the Vermont Institute of Natural Science's ELF program. Through ELF (Environmental Learning for the Future), teachers, parents and community-member volunteers are trained in a variety of activities useful in exploring the environment with children.

ELF is short on lectures and big on involvement, and creativity is key to activities on "Adaptations" (what kind of teeth would it take to eat Steamed Stems or Toasted Tails?), as well as "Habitats," "Cycles," and "Designs of Nature" (what makes a dandelion such a persistent survivor?). ELF brings parents and community members into the education process, while getting

### SEED DISPERSAL

#### Ingenious Ways to Get Away

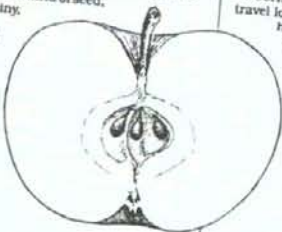


Anyone who has blown the fluffy seeds from a ripe dandelion or tossed an apple core onto the ground has unwittingly contributed to one of the most important missions in the plant world—seed dispersal. For without the dispersal of seeds to new locations, young seedlings would be competing with their parent plants, often unsuccessfully, for sunlight, soil, water, and nutrients, and the plant's success as a species could well be endangered.

Seed production and dispersal may not seem especially significant to those of us whose favorite part of a plant's life cycle is the flowering stage, but for the plant it is the ultimate goal. Flowers are just one step in the process; they are the plant's way of conceiving, fertilizing, and nurturing the tiny plant embryos as they develop into seeds.

Seeds are well adapted to house the plant's next generation because they provide both nourishment and protection for the infant plant. An inner layer, surrounding the embryo, stores enough food to nourish the tiny plant when it first sprouts until its roots can take nutrients from the soil and its leaves can produce their own food.

The outer seed coat protects the embryo from drying out, freezing, and being destroyed by some animals. An apple seed is apt to be eaten, but its seed coat is relatively smooth and hard, so it passes through an animal's digestive system intact. Each kind of seed, no matter how tiny, has its own distinctive seed coat. A hand lens will reveal the ridges, indentations, and sometimes tiny hairs that give a seed its characteristic markings.



The formation of viable seeds is a plant's primary goal; their dispersal to a favorable location is the next assignment. Plants don't move, so how can plants, it is at this point, play a vital role, acorn, or a coconut in whatever way!

Biologically, the *ovule* and its technical name *sperm*, which is

Some seed eaters humans or animals discard the seeds; leave some behind for to retrieve unharmed through that eat them. Still time when humans tilling the soil and traveling to all corners of the earth, we have become the primary dispersers of many.

There are ingenious seed containers. Some wings or blades to air whichever way ash, elm, and birch. Some grow parasitically. Airborne dandelion travel long distances hooks or barbs passersby ticks at.

### SEED DISPERSAL

Season: S F

**Focus:** Seeds are effectively adapted in a variety of ways to travel away from their parent plants to new locations.

#### ACTIVITIES

**Initial Question:** What are some of the ways seeds travel away from their parent plants?

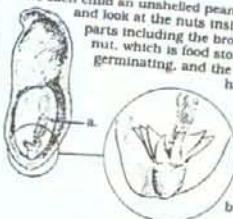
#### PUPPET SHOW

**Objective:** To introduce different mechanisms used to disperse seeds. Perform or have the children perform the puppet show. Which dispersal method did the children like best?

#### FOUND A PEANUT

**Objective:** To discover the parts of one seed.

Give each child an unshelled peanut. Open the shell (the ripened ovary) and look at the nuts inside (the seeds). Discuss the different parts including the brown papery seed coat, the bulk of the nut, which is food stored (a) for the plant when it is first germinating, and the tiny leaflets (b) between the two halves of the nut. Then eat them!



#### MIX AND MATCH

**Objective:** To encourage thinking about where some familiar seeds come from and how they are dispersed.

Have the children match seeds to their parent fruits, looking closely at the shapes and designs of both. Briefly discuss how each type of seed might be dispersed.

#### MATERIALS

• script, p. 28  
• puppets

• unshelled peanuts  
• hand lenses

• sets of cards each with a seed taped on it (e.g., apple seed, milkweed seed, burdock seed)  
• parent fruit (e.g., apple, milkweed pod, burdock seed head)

**Hands-On Nature: The natural product of the Vermont Institute of Natural Science's ELF program.**



that process out of the classroom rut and into the world around us.

After some fourteen years of ELF research and practice, compiling the activities into a book was the natural next step. *Hands-On Nature*, over 230 pages worth of background material and activities, was published by the Vermont Institute of Natural Science in 1986.

Like its mother project, ELF, *Hands-On Nature* is not designed exclusively for teachers. Each of its thirty-three "workshops" includes a background essay that provides enough information for even the uninitiated to use the activities confidently. In addition, those wishing more information are directed to a glossary, and to a bibliography of environmental education and natural history books for both adults and children.

*Hands-On* users, whether they be teachers, parents, Scout and 4-H leaders, or just those interested in nature, are then treated to half a dozen activities on the workshop topic. The activity objective is stated and the activity is clearly described; if an activity includes one of *Hands-On's* creative puppet shows, a full script is also provided. Necessary materials are listed, (with a handy appendix for those who want to know the latest in felt-board technology or need an address to order good, cheap hand lenses).

Not surprisingly, *Hands-On Nature* has enjoyed an enthusiastic reception, not only from its ready-made fans involved in ELF, but also from science teachers across the country, such as those who snapped it up at a recent national convention of science teachers. *Hands-On* editor Jenepher Lingelbach, VINS' Director of Education and active in ELF since its inception, is delighted with the response, and would like to see the inspiration for *Hands-On* spread even further.

"Our ELF program is described in *Hands-On Nature*," notes Lingelbach. "I'm hoping that some of these schools will pick up the idea of involving community

PASSIVE
SPRING
LANGUAGE ARTS

**Title:**  
*Sell the Syrup*


**Objectives:**  
Students will learn the concept of marketing a product. They will understand that selling a product should include honesty and creativity. They will make their own label.

**Grade Level:**  
3-4

**Groupings:**  
Three groups

**Materials:**  
Paper, markers or crayons

**Time Allotment:**  
30 minutes



**Scope and Sequence:**  
Matter all around us

**Sharpening Skills:**  
Creativity, analysis, reasoning

**Directions:**

1. Bring in different types of packages of maple syrup. Discuss which is the most appealing, most honest, most misleading, etc. Be sure to correlate the ingredients with the right package.
2. As a class, decide that you are going to make your own maple syrup. This means designing a label, coming up with a song, and designing a container.
3. Split the class into thirds.
4. One group is assigned the task of creating a song (use a commonly known tune and a list of all the key points about maple syrup).
5. The second group should design a container, either a commonly available shape or an invented one. List what should be considered (how it is held, dripping, storage, color, etc.).
6. The remaining third creates a label. Again, list important parts of a good label (shape, color, what is said, use of pictures, etc.).
7. Majority rule should be used to settle questions in all groups.
8. Back together as a class, combine design ideas and, if possible, create an example of the container-label on it and...

ACTIVE/PASSIVE
SPRING
SCIENCE

**Title:**  
*Cow Digestion Puzzle*


**Objectives:**  
Students will learn the different parts of a cow's stomach and will understand that the production of milk is linked with its unusual digestive system.

**Grade Level:**  
5-6

**Groupings:**  
Pairs or small groups

**Materials:**  
Cow digestion puzzle (one per child), search cards

**Time Allotment:**  
20 minutes

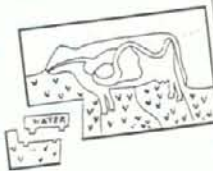


**Scope and Sequence:**  
Energy, nutrition, food, introduction to animal cycles


**Sharpening Skills:**  
Classifying, sequencing, inferring, hypothesizing

**Directions:**  
(Note: This activity will work best in conjunction with a field trip.)

1. As a class, discuss the cycle of a cow—what she eats (hay, grain, etc.) and what she produces (milk, manure).
2. Since "chewing cud" is an activity that all animals do, have the class hypothesize its purpose in the cycle of the cow.
3. Hand out to each child the cardboard puzzle pieces (see Appendix for template to prepare these.)
4. Have everybody put together the puzzles.
5. Match the search cards to the correct part of the puzzle.
6. Get a poster or draw a picture of a human digestive system. List similarities and differences.
7. Compare the cow to the other ruminant animals, sheep and deer. Discuss what the word *ruminant* means.
8. Discuss ruminants as they relate to adaptation.



A cow's stomach is much more complex than that of humans and other non-ruminant animals. Four chambers, or stomachs, constitute the digestive system of a cow. After food is initially eaten, it is partially digested, regurgitated, and chewed again. This is known as "chewing the cud," and is also where the terms "to ruminate" and "ruminating" come from. The food is swallowed again, and digestion is completed after the food travels through the four chambers.



**Project Seasons: The seasons of a farm are teaching tools in Shelburne Farms' latest effort.**

RING: 5-6  
7



members—and spread the ELF idea across the country.”

## Seasons and Agriculture

As with *Hands-On Nature*, it was a wide interest in teacher training workshops (not to mention the increasing costs of copying materials) that spurred the publication of *Project Seasons*, published in 1986 by the Stewardship Institute at Shelburne Farms. With its roots firmly imbedded in the soil of Shelburne Farms' century-old agricultural estate, *Project Seasons* uses the theme of seasons on a farm to integrate teaching and the environment.

More than three years in the making, *Project Seasons* began with over ten times the activities that the final publication has. One hundred fifty teachers in five states field-tested the activities, and their feedback helped Farms staff and advisors whittle the collection down to some eighty of the best activities.

*Project Seasons'* format was also the result of a great deal of research and testing. Every standard science and environmental education curriculum was reviewed, and interviews with teachers, superintendents and other education professionals were conducted.

The result is an attractive, open format divided into fall, winter and spring sections, and subdivided into suggested age ranges (K-2, 3-4, 5-6 grades). Each activity is clearly notated for type of activity (active/passive), disciplines (science, math, art, etc.), objectives, groupings (entire class, small groupings, individuals, etc.), materials, suggested time allotment, and more. Activities are then outlined, with extension activities noted.

Although quite detailed in presentation, *Project Seasons* includes little background information, and presumes that the user has a solid education in basic science and agriculture, or at least an interest in doing a little research. The book is aimed at complementing the average science curriculum, however, and

it is equipped with detailed appendices and resource listings, including helpful illustrations that supplement particular activities.

According to Megan Camp, who, along with Scout Proft, assisted former Shelburne Farms Education Director David Barash in editing *Project Seasons*, their research reminded them that teachers are loaded with multiple duties. Teaching the three R's is just the beginning, with responsibilities for teaching many societal skills, drug abuse prevention, and much more added on.

“We also had to recognize that teachers are often creating lesson plans after already having put in a long day,” notes Camp. The idea behind *Project Seasons*, then, is to help ease the process of teaching science—including agriculture or environmental studies—by offering activities that integrate the material in with topics that teachers are familiar with.

“So why not write a language arts activity around snowflakes?” asks Camp. “Or a math activity involving dairy production?” Natural resources are all around us; environmental education activities like those in *Project Seasons* help make those interconnections obvious.

Feedback is positive from *Project Seasons* users all over Vermont and New England. Through teacher workshops, conferences, and word-of-mouth, its use will undoubtedly spread—to anywhere where there are seasons.

## Carrying It On

The Vermont Department of Education has developed a recommended science “framework” for grades K-12—a list of scientific concepts that should be covered at the different grade levels. School districts then write science curricula—and hope that the teachers have the educational tools to follow them. This is where environmental education curriculum supplements fill the gap; they help teachers to teach science.

Grade school teachers are the most able and eager to incorporate the environmental educa-

tion materials into their day, because they are given the most topic flexibility. Environmental educators bemoan the fact that high school science is so focused on college preparation courses—biology, chemistry, and even physics—that environmental education may only be snuck into freshman earth science, or restricted to those students who are not college-bound.

Given the successes of their materials, however, conservationists will work to see environmental education integrated more officially into science curricula.

“The ideal goal that I have would be a semester in high school devoted to environmental studies,” says Fish and Wildlife’s Mark Scott. Reaching such a goal will require some work, but “when that day comes,” smiles Scott, with a nod toward his environmental education texts, “we’ll need great materials like these.”



*Project Learning Tree, Project WILD, Hands-On Nature and Project Seasons* are only a small sampling of the environmental education materials available to teachers today. Nationally-distributed programs such as *Naturescope* and the *Class Project* (from the National Wildlife Federation), *OBIS* (Outdoor Biology Instructional Strategies), “*Conserving Soil*,” (from the U.S. Soil Conservation Service), and many others should be investigated by teachers interested in science teaching supplements.

Many independent environmental educators are also active in Vermont, offering informative workshops to teachers and students. And Vermont environmental and nature centers catering to school groups are even more abundant. (See “*Tomorrow’s Environmentalists Taking Shape*,” Fall, 1985 V.E.R.)

Courses such as the University of Vermont’s Environmental Education, offered through the Environmental Program, are designed to familiarize teachers with the many resources offered. Information on these organizations and publications may also be obtained from VNRC. And watch the V.E.R. for announcement of VNRC’s *Vermont Environmental Directory*, a comprehensive listing of Vermont’s environmental education, advocacy and regulatory resources.



# Watching Over "New England's River"

By Geoff Dates



*As part of VNRC's continuing role as a true "Council" to Vermont's conservation community, we present a series of updates from our member organizations around the state. In this issue, we hear from the Connecticut River Watershed Council.*

The story of the Connecticut River Watershed Council is, in large measure, the story of the river itself. The thirty-five years since the formation of the Connecticut River Watershed Council have seen dramatic improvements in the quality of the river and its tributaries. Yet the dramatic clean-up of this river system is only the latest installment in a story which began millions of years ago. To understand the river today, you must know its story.

*Above: White River or "Olcott" Falls around 1900, near the present site of the Wilder Dam. Photo credit: Baker Library, Dartmouth College.*

## An Introduction to the Connecticut

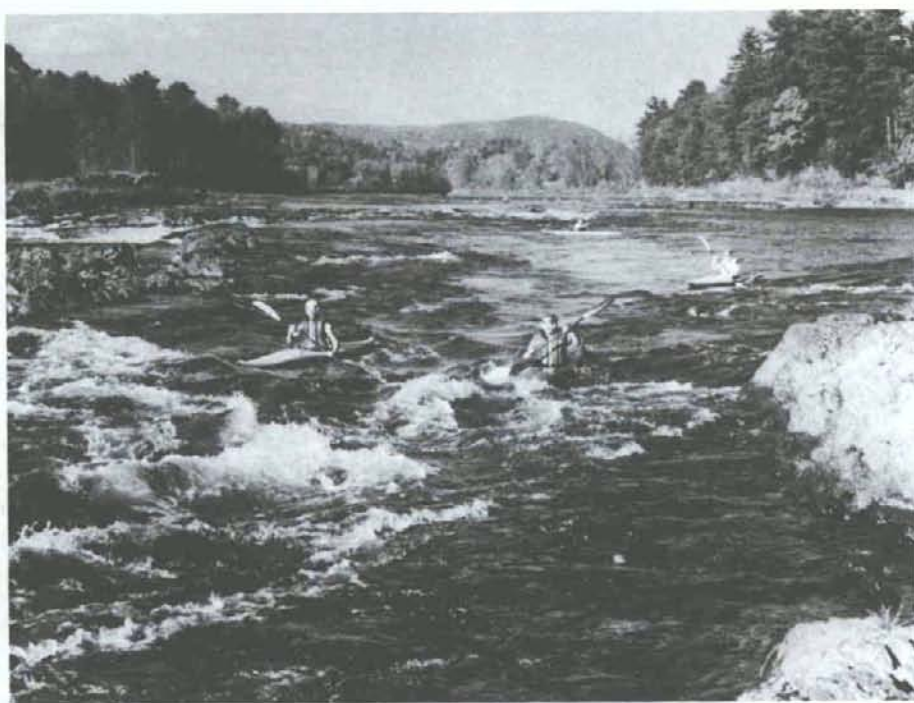
The river rises in a tiny bog known as the Fourth Connecticut Lake, near the Canadian border, in Pittsburg, NH. At the outlet of the bog, the young river is little more than a small stream. Here you can say, without exaggeration, that you have jumped across the Connecticut River. From here, the river falls steeply to the Third Connecticut Lake and then through three reservoirs, the Second and First Connecticut Lakes and Lake Francis. These reservoirs provide storage for downstream hydroelectric dams. At the outlet of Lake Francis, the river has dropped about 1300 feet, about half of its descent to the sea, in its first thirty miles.

From the near-wilderness of its beginnings, the river flows 411 miles through a patchwork of farm and forest land, forming the

border between Vermont and New Hampshire. It spills over sixteen power dams, meanders through some of the most fertile land in the northeast, flows through major metropolitan areas such as Springfield, MA and Hartford, CT and finally empties into Long Island Sound in Old Saybrook, CT. It drains an area of approximately 11,260 square miles, making it the longest river and the largest watershed in the region. Major tributaries in Vermont include the Passumpsic, Ompompanoosuc, Ottauquechee, White, Black, West and Deerfield rivers.

Geoffrey Norman wrote in a recent *New England Monthly* article on the river: "It is the backbone, the spinal column of essential nerves, of New England. Without it our history would have been vastly different, and the social evolution from early exploration through trade, farming, industry, and on to recreation and the modern age would have been





impossible. See the river, then, and you see into the way things have worked out in New England."

The valley of the Connecticut River was formed hundreds of millions of years ago during the great geologic upheavals which formed the Green and White Mountains. Immediately, of course, water, wind and weather began to wear down these mountains, filling the central valley with sediment. Since that time, the valley has seen extremes of climate and environment, from lush tropical forest, to barren arctic tundra following the last glaciation.

About 8,000 years ago, the first human inhabitants lived in small migratory bands. The Abenaki people used the river as a summer hunting and fishing ground. They called the river "Queneh-tacut" which, depending on which translator you believe, meant either Long Tidal River or Beautiful River. There is no evidence of any permanent settlement until the arrival of the Europeans in the 1600's. Until that time, in

*Above: Kayakers approach Sumner Falls, one of the few significant sets of rapids left on the Connecticut. A proposed dam at Hart Island downstream would inundate this site. Photo by Bob Linck.*

fact, the impact of humans on the river and its valley was negligible. In the last 300 years, humans have altered the valley to an extent exceeded only by geologic processes taking hundreds of millions of years.

### Changing the Face of the Valley

Three concurrent activities were to dramatically alter the ecology of the watershed: logging, waste disposal, and dam-building.

The cutting of the great forests was the first major change. Land was cleared for farming, the great white pines were taken as masts for the King's navy, and the great hardwood forest became lumber to build ships, factories, towns and cities. By the end of the 1800's the valley was almost 90% clear. This had a dramatic impact on the hydrology of the watershed. Surface runoff, erosion, and sedimentation increased as the forests were cleared. The great log drives accelerated river bank erosion, and left the rivers choked with organic matter.

Almost from the first, settlers were bent on taming the river. The rapids at Enfield, CT and Bellows Falls, VT were bypassed with canals. Hydroelectric dams were constructed at rapids, water-

falls and gorges. The free-flowing river became a series of reservoirs. In 1904, the hydroelectric dam at Holyoke, MA became an impassible barrier to migrating Atlantic Salmon and American Shad. The dams, however, were probably not the primary reason for the disappearance of the Atlantic Salmon—municipal and industrial waste had rendered the river unfit for cold water species.

### An Open Sewer

Cities, towns, factories, mills—they were all located on the rivers. Water provided power and a place to dump waste. Sewage, paper and other mill waste, tannery dyes and other industrial discharges had turned the river and tributaries into open sewers by the mid-1940's. Some reaches were biological deserts. The waste problem was exacerbated by the fact that reservoirs don't clean as rapidly as free-flowing rivers. The Connecticut became known as "the nicest landscaped sewer in the country," and towns and cities showed it their backsides. Then in the late 1960's, after decades of neglect, the public began to recognize a wasted resource. It was time to clean up the river.

### A Call To Action

The Connecticut River Watershed Council was formed in 1952 by the valley's electrical utilities. Its purpose was to focus public attention on the plight of the river. In its 35-year history, the Watershed Council has been a consistent voice for clean water and the responsible management of the natural resources of the valley.

The early 1970's saw the passage of a flurry of federal environmental legislation. By far, however, the Clean Water Act has had the most dramatic impact on the river and tributaries. Construction of municipal and industrial waste treatment plants has gradually removed the bulk of the waste discharges and today about 85% of the river is fishable and swimmable.

The U.S. Fish and Wildlife Service, state fish and wildlife agen-



cies, and the utilities have joined forces in an effort to restore the Atlantic Salmon to the Connecticut River. Just last year, the first sea-run Atlantic Salmon in over one hundred years was seen in the White River. The Watershed Council has been in the thick of these efforts, as well as land conservation, floodplain management, and recreation.

### Giving the Valley A Voice

The Watershed Council today seeks to provide leadership in improving water quality (the job isn't finished) and protecting land in the watershed by bringing together government agencies, businesses, and other groups and individuals to resolve issues and plan for the future. There is no lack of issues facing the valley; just a few examples are: some parts of the river are still not meeting water quality standards; significant flood hazards exist in cities and towns throughout the watershed; new hydropower dams threaten the last free-flowing stretches of river; and Boston wants to divert part of the river's flow for the city's water supply.

In Vermont and New Hampshire, the Watershed Council's major efforts focus on its Clean Rivers Campaign (water quality improvement); Connecticut River Valley Forum (building a grass-roots coalition of valley residents, businesses and organizations to foster cooperation between the two states and plan for the future); the monitoring of various development proposals, and participating in federal and state regulatory proceedings; and land conservation (the Watershed Council is also a land trust).

The Watershed Council is also participating in efforts to develop state river protection programs in both states. A program of summer educational canoe trips on the river gives people direct experience with the resource, and the challenges that remain. The Council publishes the *Complete Boating Guide to the Connecticut River*. The Conservation Education Research Program funds small research projects on the

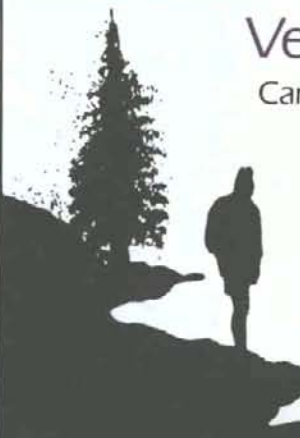
natural resources of the valley.

Keeping tabs on an 11,000 square mile watershed is a significant challenge. For this reason, the Watershed Council is embarking on a major effort to broaden its membership base, and increase its staff capability. New members mean financial stability, more political clout, and a stronger voice for the river. The Council looks to an increasing role in guiding decisions that affect the river's future, through information, educa-

tion and action.


*More information on the Connecticut River Watershed Council and its programs is available at headquarters at 125 Combs Road, Easthampton, MA 01027, tel. (413) 584-0057, or the new Upper Valley Office at 312 1st NH Bank Building, Lebanon, NH 03766, tel. (603) 448-2792.*

*Geoff Dates is the Upper Valley Regional Director of the Connecticut River Watershed Council.*



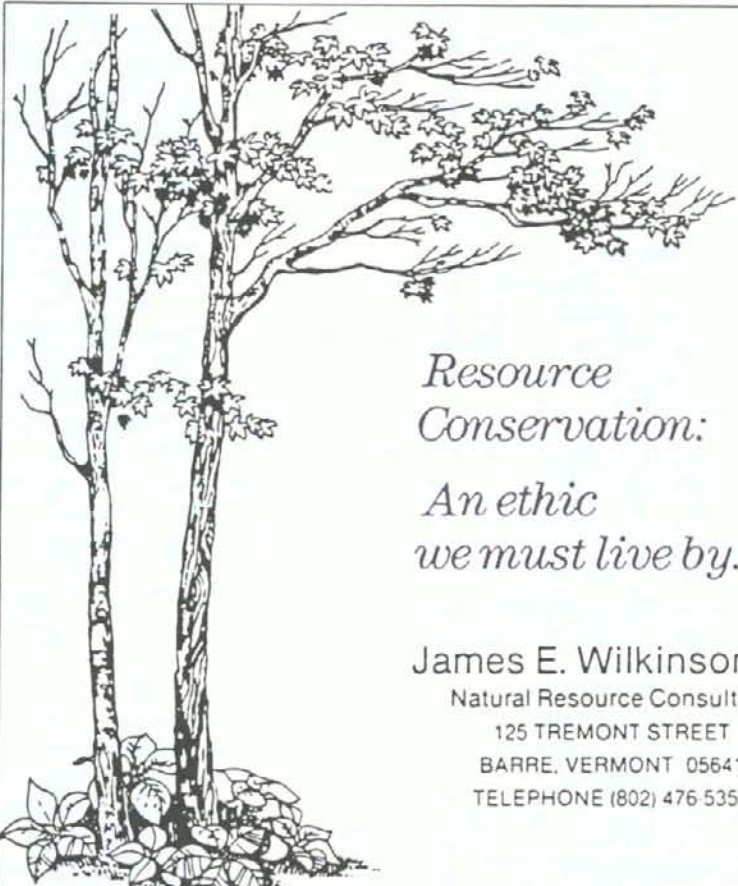
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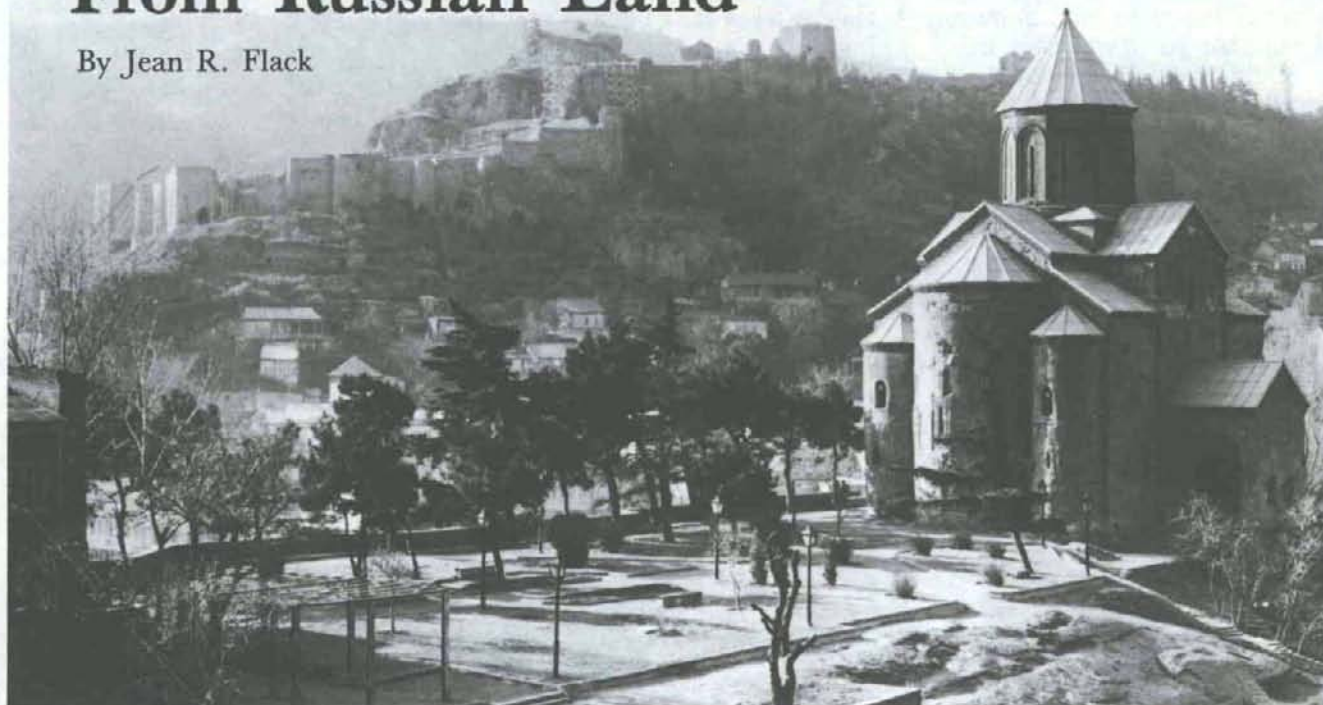
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# From Russian Land

By Jean R. Flack



## Some winter thoughts on Russian land use planning

*Jean R. Flack is the Assistant Director of the University of Vermont's Environmental Program, an Assistant Professor in UVM's School of Natural Resources, and a VNRC Board member. She is a Kellogg National Fellow, and through the Kellogg Foundation and UVM she visited the Soviet Union as part of a long-term, comparative study of the relative effectiveness of land-use planning mechanisms in several nations. Her commentary on Russia is the third in a series; 1986 issues of the V.E.R. carried her observations on China and Kenya.*

New Year's Eve was like something straight out of a Chekhov or Dostoyevsky novel. A half dozen of us walked across a bridge over the frozen Moscow River. Below us we could see some ducks huddled despondently where a steam outlet bubbled up into the solid ice. Far in the distance lay the lights of Moscow with the Kremlin lit up for this major family holiday (they call it Christmas).

The factories were almost entirely closed down for the holiday;

only the small coal-fired power stations, generating huge amounts of electricity for this sprawling city of four million Russians, marred the otherwise clear, bitterly cold night sky. Since there are virtually no air-pollution controls, the winter skies in the western USSR are so polluted that we were told that many asthmatics must stay indoors all winter. The holiday reduction in air pollution thus helped to engender an almost magical quality to the night.

Just before midnight we walked into Gorky Park, a gorgeous expansive park spread along the banks of the Moscow River. Everything was white; children's snow sculptures were scattered throughout the area, and lights blazed from huge Christmas trees complete with cardboard giant-sized Santa Clauses and Snow Maidens. Ice-covered cedar trees clinked as the bitter breeze from Siberia shook their branches.

And yet the place was entirely deserted, as though the two thou-

sand expected guests had not come. Where were the Soviets we were supposed to meet here for the New Year Party? Where was the vodka? It was five minutes to midnight. Not a sign of anyone.

Then, out of nowhere, half a dozen Russian men and women appeared with hot wine, champagne, and chocolates, laughing as the New Year approached. They stopped when they reached us, and we all counted away the last few seconds of the old year, toasted in the New Year, shared our gifts of food and drink, shook hands, kissed and then, just as mysteriously as they had come,

*All photos by Jean Flack.*

*Above: Historic preservation efforts are evident in the Kura Valley, Georgia.*

*Above right: Travellers wait for the metro in front of a "new town" apartment block.*

*Below: Russian women shopping at the market in Gory, Georgia.*



these strangers wandered away into the bitter night.

We were again alone in the enormous white expanse of park, the lights still blazing into the night sky. The evening seemed ethereal: a paradox of exquisite beauty—passionate, romantic people and a park steeped in Russian history—contrasting with the dirty, grey city beyond the river and its enormous buildings not of human scale.

### Pollution and Planning

Beginning in the 1930's, the Soviets planned their urban and ex-urban landscapes very well—and then planned and built again as World War II took a severe toll on their society. The planning is evident throughout the city.

Apartment blocks are about ten stories high, spaced widely apart to allow for maximum sunlight penetration. The couples we met in Gorky Park, for example, probably caught the super-heated metro (cheap, clean, fast, frequent, and always awfully crowded), and then would walk a short distance to their carefully planned, "new-town"-concept neighborhood units. The apartments are formed into blocks as though around a courtyard, but on such a large scale that the courtyards contain a kindergarten, grade schools, and playing fields complete with winter ice hockey rinks.

Although much of the planning work we saw in this region was admirable, other environmental efforts were sorely lacking. The homes I visited, for example, were heated to eighty degrees fahrenheit, with much electric energy obviously being wasted. Re-zoning the city seemed urgent to me, as the patches of industrial plants, seemingly haphazard in their historical locations, spewed pollution into the sky.

### An Urban Emphasis

We talked to many Soviets in their homes and at work while we were visiting. How do they like the results of their planning? They spoke with great pride

about such aspects as trees and open green spaces in and around their towns and cities. Kiev residents boasted that they have more trees per person than any other city, and more beautiful and extensive parks. In most urban areas, town and regional plans require a specified amount of open space per person, so many trees per person, and so many new plantings per year. The exact ratios are high, and vary from region to region.

Greenbelts break up the spreading urban areas, and good-quality farmland cannot be developed. I thought of the planned open space concepts used so commonly throughout much of western Europe over the last forty years,

and I again imagined how fruitfully such concepts of planning could be used in Vermont.

The Soviets have also spent phenomenal amounts of money on historic preservation and urban renewal. Buildings were restored before World War II, and then the process had to start again following the horrifying destruction of the Nazi era. Contrary to popular U.S. opinion, Russian museums, palaces, and many old buildings have been restored with meticulous attention to detail. Even churches, although used now more as museums than for religious purposes, have been preserved with great care.

I felt embarrassed at how little





effort we make in Vermont to retain the intricate detail of our cultural heritage. How few rural Vermont towns have written really functional historic preservation plans? How many historic but neglected barns and houses collapse or burn down? How little state or federal support is available here to assist with historic preservation?

Considering the rural nature of Vermont, however, and looking for comparison with the USSR, I did not notice a great deal of evidence that the Soviets have made good progress in land use planning in the rural areas of their country. Indeed, the standards of life and landscapes in much of the rural environment is obviously far behind the urban areas.

### What Can We Learn?

If Russia's urban planners have enjoyed many successes, the reasons for their ease in planning are clear. Since the land in the Soviet Union belongs to the State—that is, to everyone—it is much easier to plan. The farmer, for example, is guaranteed an income and health care until the day he or she dies, so there is no need to think of selling the land to retire to Florida (or the Black Sea, as the case may be) and providing your own pension or medical payments.

Clearly, unlike in Vermont, public opinion and rural small town democracy have played *no* role in the creation of land use patterns and environmental changes in the Soviet Union. The role of planners has been dictatorial and in-

stitutionalized there, via the education system. These notions of central control are not readily acceptable to the Vermont population! But on the other hand, many of the results of Soviet planning—methodologies aside—may provide valuable models from which we could learn.

Today in the Soviet Union there is a strong desire to allow decisions to be reached in an increasingly democratic manner, which we in the West applaud. Of course, from the point of view of planning, we must note that increasingly democratic decision-making and citizen input in the USSR comes after two generations of state-level planning. The present well-educated Soviet generation is horrified at the increasing evidence of poor air quality, poor water quality, and a low standard of living in rural areas. At the same time, the Soviets can take great pride in their greenbelts, regional plans and new towns.

Popular Soviet magazines have only recently begun to publish articles demanding better environmental planning. Environmental activists have been common here in Vermont for over two decades, but major lobbying efforts are only beginning in the Soviet Union. Recently lobbying work by Soviet environmentalists and young people have shown success, however; one effort even led to the scrapping of a project to divert some of the north-flowing rivers into the drying southern part of the nation—a project that could have had extensive environmental repercussions.

### Sharing Successes

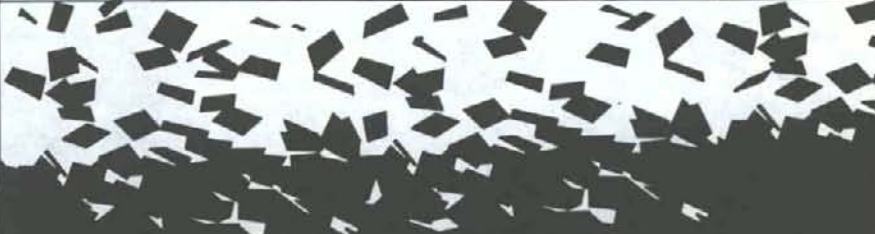
Those Soviet scenes of greenbelts, parks, new towns and historic preservation are not perfect. Planning methodologies in England, Holland and Denmark over the last forty years would show us some equally good or better land use planning on a smaller scale. Indeed, in many European countries where land is in private ownership, there is an inspiring commitment to providing high diversity environments through planning and preservation efforts.

It is clear that these countries' decisions to provide money, tax breaks and other incentives not only for growth control but also for designated *areas of growth*, and most importantly, money for areas *not to grow*, have helped the land and people. The cultural landscapes in much of Europe—Russia included—have evolved to meet the social and economic needs of the majority.

In Vermont we struggle to have a viable economy yet maintain our rural and "small town" images. Our battles between public and private rights generate conflicts in land use planning. Do we need "growth control" alone, or comprehensive state and regional planning?

Planning needs mechanisms that are environmentally sound, economically feasible, socially desirable and politically viable. Education and strong leadership are vital to ensure that those criteria are met before the crisis stage. There is an urgent need for such planning action in Vermont right now.

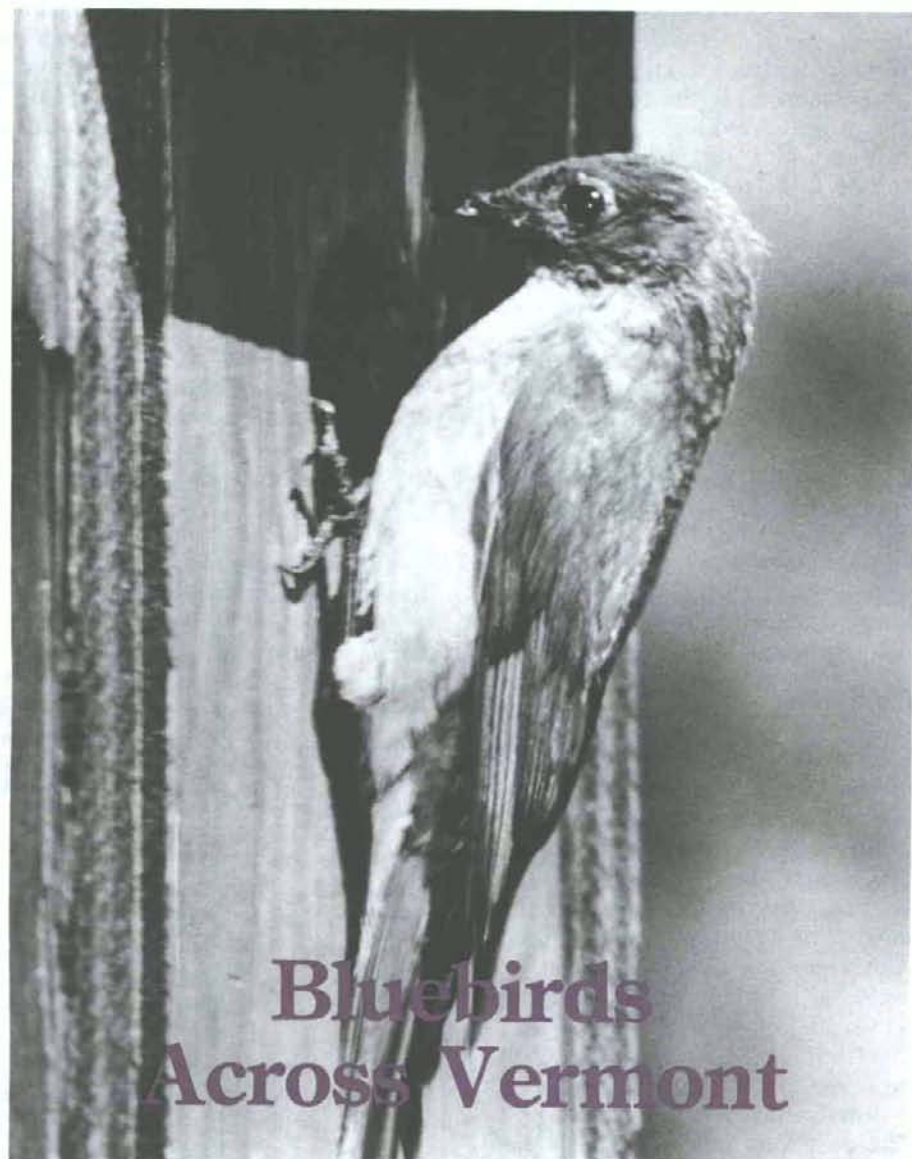
As I crunched through the snowy streets of the villages and cities of the western Soviet Union, I marvelled at the Soviets' determination to overcome their harsh geographic location and severe climate. I also took note of their obvious pride in the solid evolution of their cultural landscape in this heartland of the Old World. They will no doubt learn a great deal from us over the next generation, and we could certainly learn a great deal from them.



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By Steve Parren

In his 1867 book *Birds of New England and the Adjacent States*, E.A. Samuels refers to the eastern bluebird as a "very common" summer inhabitant of New England. Why, then, have many Vermonters today never seen a bluebird? The eastern bluebird suffered a serious population decline in this century. The dual impacts of reduced numbers of nesting cavities and competition with European house sparrows and starlings since the late 1800's led to an estimated 90% decline in the numbers of our native

bluebird.

Bluebird habitat continues to be lost due to succession from abandoned farmland to forest in Vermont; one hundred years ago Vermont was mostly open land, but today forests cover most of the state. Vermont also experienced a human population surge starting in the mid-1960's that has converted much open land to residential use. In addition to these habitat losses, the bluebird faces competition not only with non-native birds, but also with native birds including house wrens and tree swallows. Bluebirds are also subject to pesticide poisoning and natural disasters

such as unusually harsh weather, either of which devastate bluebird populations.

### Bluebird Trails

Despite its small numbers, the bluebird continues to hang on in Vermont—much to the delight of the lucky few who catch a glimpse of one. The migratory eastern bluebird returns to Vermont each year, bringing color and song to our meadows, gardens, and lawns.

The bluebird is not endangered in our state, thanks in part to the placement of nest boxes over the past fifty years. It is well documented that the establishment of bluebird trails, (the placement of series, of nest boxes across the countryside) has enabled bluebird populations to increase. The efforts to help the bluebird in Vermont, although very beneficial, have been limited in scope; Vermonters are embarking today on the first comprehensive program to create a web of bluebird nest boxes across Vermont.

The Vermont Audubon Council, with staff support from National Audubon Society and financial help from the Vermont Fish and Wildlife Department, The Cecil Howard Charitable Trust, and concerned individuals, has created the largely volunteer Bluebirds Across Vermont bluebird nest box network. The purposes of this nest box network are to provide enough suitable nesting sites to allow Vermont's bluebird populations to increase in numbers and to gather information that will allow a better understanding of how the bluebird is faring in our state.

### A Bluebird's Vermont Home

Unlike many creatures that we strive to protect, the bluebird is readily accessible, spending part of every year in our yards and meadows. Eastern bluebirds are slightly larger than house sparrows, and have a characteristic hunched or round-shouldered posture when perched. The male has

*Above: Eastern Bluebird, caught on film by Roy Pilcher of Proctor.*



a completely blue back with rust-colored throat and breast. The female is not as bright, with grayish-blue back, but the bright blue shows in her wings and tail.

Bluebirds are members of the thrush family, as is the robin, as evidenced by the spotted thrush-like breast of the juveniles. Of all the thrushes, only bluebirds nest in natural cavities or nest boxes. Bluebirds feed mainly on insects such as grasshoppers, caterpillars, and cutworms. From a tree branch, post or telephone wire, the bluebird searches the ground for its insect prey, and then drops to the ground for the catch.

Male eastern bluebirds come north to Vermont from their winter haunts during the lengthening days of February and March. Harsh weather is an ever-present danger to the early arrivals, robbing them of already-low fat reserves and making it harder to find food. Numerous bluebirds may huddle together for warmth in a single nest box to escape the worst of the late winter chill.

Males search for cavities, showing them off to the female bluebirds when they arrive in Vermont soon after the males.

Singing and exhibiting flirtatious tail and wing displays, males attempt to attract a female to one of the cavities he has found. I have watched a pair of bluebirds spend an entire day exploring together the dozen nest boxes visible from my home. If a female accepts a cavity she also accepts the male as her mate.

Nest-building may begin immediately, or up to six weeks later. Most of the work is done by the female, with the male tagging along after her. In about six days, a completed cup of fine grass, plant stems or sometimes pine needles will cover the bottom of the nest cavity.

### Raising the Family

The female lays three to six blue eggs, one egg per day. Although the male will not assist in incubation, he will remain close at hand to defend his mate and nest. The eggs hatch after about thirteen days and are fed in the nest for another seventeen days. Both parents care for the nestlings, keeping the nest clean and feeding the young from dawn to dusk. Soft insects are fed to the nestlings initially and shelled insects such as grasshoppers are brought later as the young grow.

After the young fledglings leave the nest on their own power, the parents will continue to feed the young birds for seven to ten days. It will be another week or

more before the young bluebirds are completely weaned and the adults can begin a second nest. If the first nest is built in April, a second nest may be built in June. In some parts of their range, eastern bluebirds sometimes raise as many as three broods.

Bluebirds display a wide range of temperaments. One pair nesting in a box I placed in a remote U.S. Forest Service clearcut never let me any closer than one hundred yards. But another pair I know of would perch on bean poles as friends of mine worked nearby in their vegetable garden.

When killing frosts and colder weather remove much of their insect food, eastern bluebirds begin to migrate to their southern wintering grounds where fruits and berries will become a major part of their diet. Groups of bluebirds may be observed feeding together in the fall prior to or during their southern migration.

A few of the hardier bluebirds may hang on in Vermont after the New Year begins, until a cold snap forces them south. Eastern bluebirds winter from southern New England to Nicaragua, but it is likely that the bluebirds that breed in Vermont will spend the winter in the United States—as Vermonters ski, sled, shovel, and hopefully await the cheery arrival of the bluebird in the spring.

*Bluebirds returned to Vermont in March, but a certain number of birds nest late, and re-nesting is also common. Write to Bluebirds Across Vermont for information on creating a home for a bluebird in your area.*

To join the network, send your name address, and a one-time \$10.00 membership fee to: Bluebirds Across Vermont, c/o National Audubon Society, Box 9, Fiddler's Green, Waitsfield, Vermont 05673. You will receive the network's comprehensive booklet on bluebirds, a nest box survey form, and a list of contact persons and organizations.

Steve Parren is a Board Member of the Green Mountain Audubon Society, and State Coordinator of Bluebirds Across Vermont.

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## THE COUNCIL



The Homer W. Dixon

Photo by R.M. Fischer

### Lake History From A Schooner's Vantage Point

VNRC Executive Director R. Montgomery Fischer is just one of the noted instructors who will be aboard the *Homer W. Dixon* during Lake History Week 1987, June 21-27. Co-sponsored by the Champlain Maritime Society and the *Dixon*, a six-day educational program aboard the schooner will cover topics including pre-history, the Colonial era, war times, times of thriving commerce, today's environmental issues, and the lake's future. Cost for the week is \$425 per person, minus a special ten percent discount for VNRC members.

Other special cruises include *Songs on the Water*, June 28-July 2, featuring acoustic music for musicians and listeners; and *Champlain Geology*, September 20-24, co-sponsored by the Association for Women Geoscientists. Call 862-6918 for details on the *Dixon*.



### Reidel Elected to NWF Board

Congratulations to Dr. Carl Reidel, who was elected this spring to the Board of Directors of the National Wildlife Federation. He will be the sole director representing New England.

Reidel is Chair of the Environmental Program and Professor of Natural Resource Policy at the University of Vermont. He is well known to Council members as a VNRC Board member for twelve years, serving twice as chair. As the Vermont affiliate of the National Wildlife Federation, VNRC was proud to nominate Reidel, and honored by his unanimous election.



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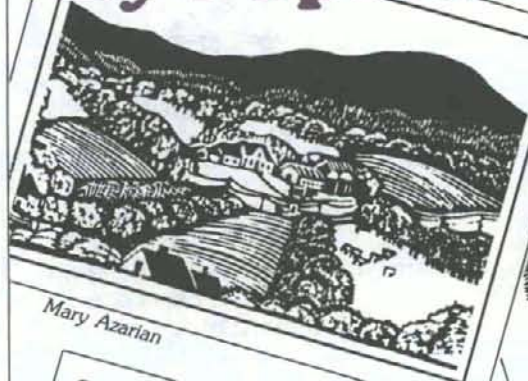
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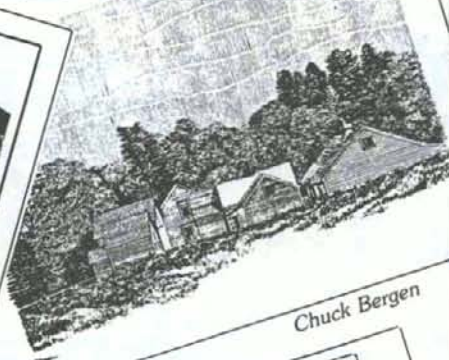
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Shari Stahl

### A New Shari in Our Ranks

We welcome Shari Stahl to VNRC's new Membership Coordinator position. Shari's position was created when Membership and Development Coordinator Nancy Miller left the Council in late January.

With a background in English and training as a paralegal, Shari brings a variety of skills to her position, including useful experience in the non-profit sector. Shari's responsibilities include maintaining VNRC's membership records and coordinating mailings; she will also be active in planning and implementing the Council's membership program. And her part-time position will leave her a few afternoons a week to pursue her new love—gardening.

### Tune In for VNRC

The Council's Information and Education Committee is proud to announce its newest creation, a set of three thirty-second radio public service announcements. The PSA's, complete with the sound effects of loons, birds in a breezy summer field, and a rain-storm and babbling brook, are narrated by VNRC Board member Mark Breen and serve to remind the public of VNRC's continued commitment to protecting Vermont's natural resources. The PSA's are being distributed to radio stations statewide; let us know when you hear one broadcast on your local station!



## VNRC INTERNS



**Dana Hearn and Lisa Borre**

As legislative liaison assistant to VNRC Associate Director Eric Palola, Dana Hearn has tracked legislation and committee work throughout this legislative session. Dana has followed several key issues, including solid waste disposal, underground storage tanks and rivers protection.

With a degree from the University of Vermont in environmental education, Dana has worked as an environmental educator and has been a consultant and tour guide at the Winooski Valley Park District.

Dana is VNRC's third intern funded by the Council's Maurice "Red" Arnold Memorial Internship Fund. Arnold, who died in 1983, was a VNRC director and state legislator; the fund was created to honor and continue Arnold's conservation ideals.

University of Vermont graduate Lisa Borre finishes up a grant proposal on wetlands this spring for VNRC. If accepted, the grant will fund the creation of much-needed educational materials for municipalities on inventory and protection programs for wetlands. Lisa has also been studying existing surveys of Vermont bodies of water, and the subject of how to interpret the "significant ecological value" criterion of the water quality bill passed last year.

Lisa has had to juggle her work with her international travels as a member of a U.S. hockey team. But her studies and research assistantship in geology have given her the tools to wrap up the projects with flair.

### Bill Kenny

During the first part of Bill Kenny's winter/spring internship with VNRC, he compiled the educational resource list which supplemented the 1987 National Wildlife Week clean air educational packets. Bill also condensed a number of V.E.R. articles for publication in weekly newspapers statewide. Finally, Bill assisted in the preparation of this issue of the V.E.R. Bill is a junior at the University of Vermont, majoring in environmental studies; he plans to pursue a career in environmental policy.



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### New Members

VNRC is pleased to welcome the following new members who joined us between December 15 and April 1: Mr. and Mrs. Lawson I. Ainsworth, William Allen, Raimon L. and Frances Bears, Gordon D. Bevin, Bruce Berryman, Mark Breen, Betsy Brigham, Cadys Falls Water Co-op, Harry E. Chandler, Town of Charlotte, Cassandra Zwickel Ciullo, Drs. Gail and Alban Coghlan, Sandra Collins, Consulting Foresters Association of Vermont, Cindy Cook, Richard and Susan Davis, Judith K. DiMario, Tad Dippel, Edna L. Dolber, John Elder, George and Joanna Ellis, Leah Elliott, First Twin-State Bank, Marilyn Fuller, Mr. and Mrs. Kent Gatling, Michael Green, Howard F. Gregory, Mark Hanok, John W. and Barbara Hird, Harrison Hobbitzelle, Flora B. Hollinger, Mrs. Frank Howard, Robert Howe, Nancy Hughes, Thomas L. Hurlburt, Arthur G. Krueger, Carol Litchfield, Diane and Michael Manion, Debra Mason, Linda Matteson, Mollie Matteson, Michael McCarthy, Andrea and Alan Mitter-Burke, Sarah Muyskens, Alan Moore, Wanita Oren, Barbara and Gary Ostler, Donald and Carol Ostler, O.S. Peterson, Jr., Mr. and Mrs. Martin Priest, Mary K. Quimby, J. Redmont, Robert Reschke, Joseph and Margaret Riley, Leslie Rimmer, Art and Pat Rosson, Frank and Brinna Sands, Ron and Ann Savitt, C. Robert Schulz, Mark E. Scott, Ann Seibert, Col. and Mrs. G.C. Sheldon, Springfield High School Library, Rebecca C. Skillin, Taconic Tri-State Audubon Society, Stuart Thurber, Jr., Robert and Jennifer Turner, Tbn Z. Vendetti, J.R. Walgren, Alec Walling, Watts-Up Electric Service, Roman and Jean Wickart, Matthew I. Wiencke, James Wing, Cynthia M. Yerrick, Steve Young.



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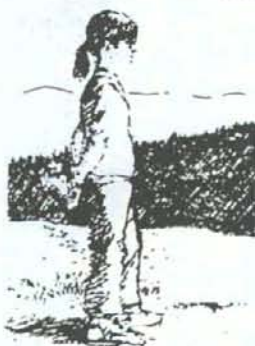
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June  
is Vermont Rivers Month!

Over a dozen events are planned statewide, including fly-fishing, paddling and white-water demonstrations, picnics, music, a hatchery tour, green-ups, speakers, forums, and more. Some of them are probably planned for your favorite river! Contact VNRC for a full calendar of events.

June 28 and July 18

Learn about **Abenaki Indian culture** and the Abenakis' relationship with their environment including their use of plants, on canoe trips sponsored by the Connecticut River Watershed Council. Instructors will include ecologist/writer Michael Caduto and historian/ethnologist John Moody. Trips will run from Cornish-Claremont N.H. (June 28) and Claremont-Charlestown N.H. (July 18). Call CRWC at (603) 448-2792 for more information.

July 19-24

Teachers will become familiar with Vermont's fish, wildlife and related resource management principles, and earn three graduate-level credits, at the Vermont Fish and Wildlife Department's course, **Fish and Wildlife Management for Educators**. The course will be held in Woodbury; fee of \$125 includes credit fees, books, room and board. For more information, contact Fish and Wildlife Department, Information and Education Division, Waterbury, VT 05676.

September 11-18

The **4th Annual Wilderness Congress on Worldwide Conservation** will be held in Colorado, with conservation leaders from across the globe gathering with other delegates for a wide variety of workshops and discussions. Conference fees range from \$125-\$200 (before July 1), excluding room and meals. Contact the Congress

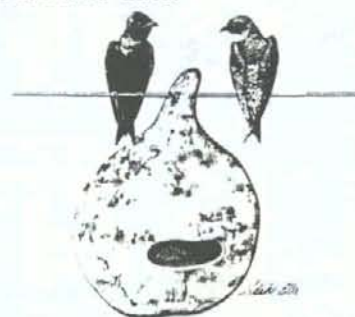
through the International Wilderness Leadership Foundation, Colorado State University, Fort Collins, CO 80523, (303) 491-5804.

October 16-21

The **North American Association for Environmental Education** will hold its 16th annual conference in Quebec City, with the theme "Showcase for Environmental Education Excellence." The conference is co-sponsored by l'Association Quebecoise d'Interpretation du Patrimoine, and will feature speakers, dozens of concurrent sessions on environmental education and issues, EE computer software, curriculum supplements, and a film festival. For information and registration packet, contact: NAAEE Conference, PO Box 400, Troy OH 45373, (513) 698-6493.

October 23-25

The Cape Cod Sea Camps in Brewster, MA will be the site of this year's **New England Environmental Education Alliance Annual Conference**. With the theme "Pushing the Limits," the conference will offer a variety of indoor and outdoor workshops for educators from all over the six-state region. Save this date!



The **Purple Martin Conservation Association** needs your help in locating and registering colonies of this species, which is experiencing long-term decline in parts of North America. If you notice martin houses or gourds in your area, or if someone you know has a martin colony or is trying to attract one, contact PMCA at PO Box 178, Edinboro PA 16412.



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