Are We Drifting Toward Energy Growth at Any Cost?

Leigh Seddon

In June of last year, Governor Richard Snelling proposed a sweeping plan for a New England "electric community" which would band together to invest $45 billion in Canadian hydropower development. In return, New England would receive 20,000 megawatts of hydroelectric power.

In February of this year, Richard Snidek, Commissioner of the Public Service Department, publicly speculated that in the next few years Vermont will need to build a new base load electrical generating facility. Most likely, it would be a large coal-fired plant located on the shores of Lake Champlain near Vermont's major load center, Burlington.

In March, John Zuckernick, President of the Vermont Electric Power Company (VELCO), unveiled before the Legislature plans for a 450 kilowatt direct current transmission line which would carry Canadian power through Vermont. The lines would carry up to 2000 megawatts of power and would be among the largest direct current transmission lines in the country.

Clearly, the Governor, his planners, and the Vermont utilities have big plans for Vermont's electrical future. Unfortunately, in the scramble to secure new power sources, conservation, Vermont's best option for meeting its future electrical needs, has been totally ignored.

CONSERVATION AS A SOURCE

Conservation is our most abundant, economical and environmentally-sound energy supply. A member of the House Energy Committee said recently that "producing energy through conservation is like increasing the food supply through starvation." But conservation does not mean simply curtailing energy use. It means increasing the efficiency of energy consumption and generation through peak load management, cogeneration and the use of more efficient appliances, heating devices and lighting systems. For every kilowatt-hour saved through increased efficiency, there is a free kilowatt-hour ready to do new work. If our homes, offices and factories can be heated and lighted with 30% less electricity by using it more efficiently, then we can, in effect, create a surplus which can be used to meet future demand.

A recent study prepared for (Energy Growth, Page 2)

Clean Air Act Revisions:
Fine-tuning or Tampering?

Jeanne Keller

The following article concerns one of the most important battles of the upcoming Congressional session. The outcome will significantly affect the quality of life in Vermont.

Should the Federal Clean Air Act be improved or weakened? The new administration and a wide array of industries would like to reduce the impact of the law on business. They would like to eliminate the Prevention of Significant Deterioration program, which protects the quality of clean air. If this provision is removed, the quality of Vermont's air could fall to the minimum standard set for the nation as a whole.

Acid rain is another problem of great importance to Vermont. It affects our soils, water, buildings and aquatic life. The Clean Air Act does not adequately address this issue and Congress must come to grips with it during the current debate.

This year, Congress will debate and amend the Clean Air Act, the cornerstone of our national air pollution control program. The issues and the people involved are reminiscent of last year's Alaska land battles: wildlife, environmental and safe energy groups arguing for protection and reasoned development of our natural resources versus industrial and government forces promoting the quick fix and the fullest possible exploitation of those resources. But this year's battle asks more fundamental political questions.

The Clean Air Act is currently designed to protect the health of our citizens as well as the quality of our environment. But if the Reagan Administration prevails, we will have to weigh the value of human life and health against industry profits. We will have to answer questions such as, "how many early deaths can we absorb before an additional flue-gas scrubber is worth it?"

HISTORY OF THE CLEAN AIR ACT

Between 1955 and 1967, Congress enacted several pieces of legislation aimed at controlling air pollution. But in the absence of uniform federal guidelines, some states refused to enact strict controls because they feared that would place them at a competitive disadvantage in attracting new industry. Consequently, in 1970, Congress enacted the Clean Air Act Amendments, the first comprehensive nationwide effort to control air pollution. The 1970 Amendments:

- required the newly-formed Environmental Protection Agency to establish National Ambient (surrounding) Air Quality Standards, with attainment of the standards targeted for 1975.
- directed states to develop implementation plans for attainment of the national standards.
- authorized the EPA to set emission limits for new stationary pollution sources (power plants, factories, etc.)
- authorized the Federal Government to monitor and enforce the Clean Air Act

Subsequent lawsuits and major amendments to the Act in 1977 extended compliance deadlines, set penalties for non-compliance, created the Prevention of Significant Deterioration Program, and put into effect many of the EPA's policies for reviewing existing pollution sources and granting permits to new sources.

Vermont's air quality program began in 1968, when the General Assembly gave the Health Department the authority to operate a statewide air pollution control program. The Agency of Environmental Conservation took charge of the program in 1972.

The current Clean Air Act regulates emissions of the six most common pollutants: total suspended particulates (TSP), sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone and lead. The Act directs the EPA to set acceptable limits for each pollutant. Areas of the country that are not in compliance with the standards are called "non-attainment areas."

Vermont has relatively clean air, but it also has several non-attainment areas.

(Clean Air, Page 8)
Energy Growth at Any Cost?

(Continued from Page One)

The study further estimates that conservation and cogeneration combined with electricity derived from new small-scale hydro, wood and wind would enable Vermont to meet its power demands until the year 2000 without building new nuclear, oil or coal facilities and without buying Canadian hydropower (see table 5).

"A member of the House Energy Committee said recently that 'producing energy through conservation is like increasing the food supply through starvation.'"

Public Service Commissioner Richard Saudek disputes this contention and expects Vermont's electrical consumption to increase sharply as other sources of energy become more expensive. Nevertheless, it is clear that conservation can make a significant contribution to Vermont's electrical capacity. And it can do so at a fraction of the cost of investing in new power plants. A recent study by the Environmental Defense Fund showed that conservation can provide additional electricity for $397 per kilowatt versus $1200 per kilowatt for a new coal or nuclear plant. And while coal and nuclear plants only operate about 70 to 80% of the time, insulation and other conservation measures work 24 hours a day, seven days a week.

"Conservation is our most environmentally-sound energy option. It does not produce atmospheric pollution, it requires no transmission lines which mar our countryside and deplete our agricultural land base, and it does not further deplete our stock of fossil and nuclear fuels."

Vermont's Middlebury College has set an excellent example in the conservation field, demonstrating both the potential and the economic benefits associated with a comprehensive energy conservation program. A "peak alert" program which warns students during peak demand periods so they can turn off unnecessary lights and appliances and a cogeneration facility which uses waste steam heat to produce electricity have enabled Middlebury to cut its electrical consumption by 24% since 1978. And it has done this while expanding its building area by 60%! Last year alone, Middlebury saved $90,000 through its conservation efforts.

Conservation is also our most environmental-sound energy option. It does not produce atmospheric pollution, it requires no transmission lines which mar our countryside and deplete our agricultural land base, and it does not further deplete our stock of fossil and nuclear fuels. But so far, there have been few indications that the Legislature is willing to do this.

The Vermont Legislature considered a number of energy bills this year. Perhaps the most important and timely bill was H.220, which would have included utilities in statewide conservation programs to include home energy audits, energy-saving home improvement loans, cogeneration and load management. After considerable discussion, the bill was tabled until the next session. The Legislature also failed to act on a bill to boost Vermont's home energy audit program, a conservation retrofitting bill, and several other important energy-saving bills.

The Legislature must participate in energy decision-making in order to ensure that Vermonters have a voice in their energy future. But so far, there have been few indications that the Legislature is willing to do this.

The Legislature does participate in energy decision-making in order to ensure that Vermonters have a voice in their energy future.
Calendar

Thursday-Friday, June 11 & 12
The Vermont State Energy Office is co-sponsoring a two-day workshop on "Solar Energy and Environmental Action" at the Holiday Inn in Brattleboro. Contractor-built collectors cost about half as much as prefabricated models. For more information, write Total Environmental Action, Harrisville, New Hampshire 03450.

Wednesday, June 17
The Vermont Institute of Natural Science will present a Slide Lecture by State Naturalist Charles Johnson beginning at 7:30 p.m. at VINS in Woodstock. $2.00 for members and $2.50 for non-members. Call 457-2779 for more information.

Tuesday, June 23
Vermont Ground Water Protection Strategy Public Meeting. The Department of Water Resources and Environmental Management will present a preliminary draft of a ground water protection strategy at a meeting in Montpelier's Pavilion Auditorium. Sessions run from 1:30 to 4:30 and 7:00 to 9:00. You can obtain the draft strategy by calling Cheryl King at 828-2761.

Wednesday-Friday, June 24-26
Shelburne Farms will conduct an intensive seminar entitled "New Food Systems: Issues and Opportunities," including discussions of regional production and marketing facilities and new food and tool businesses. Request a brochure by calling 985-3222 or by writing Shelburne Farms, Shelburne, Vermont 05482.

Monday, June 29
Fern Facts and Folklore. Henry Potter, a fern expert well-known to three generations of Vermont naturalists, will give a lecture at VINS at 7:30 p.m.

Monday-Friday, June 29-July 3
The Historic Preservation Summer Institute is offering a five-day course in "Energy Conservation and Potential for Historic Buildings." Write the Historic Preservation Summer Institute, Grandlamp, UVM, Burlington, VT 05405 for more information.

Monday-Friday, July 6-10
Environmental Education Teachers' Workshop at Shelburne Farms. Graduate credit available.

Thursday, July 16
VNRRC Brown Bag Lunch. Debbie Brightton will discuss the effectiveness of the Current Use Tax. 12:15 to 1:30 at VNRRC.

Thursday, July 30
VINS Annual Meeting. Bring a picnic and enjoy a program on "Owls of Vermont." 6:30 p.m. at VINS.

Friday-Sunday, August 20-23
The theme of the 7th Annual Natural Organic Farmers Conference at Johnson State College in Johnson, Vermont, is "Farming on a Small Planet: New Concepts and Technological Changes." Several workshops will explore new ideas in farm design, farming techniques, marketing and public education. Register by July 25th. Call 456-7456 for more information.

I-93 SUIT HEADS FOR A HEARING IN NEW YORK CITY

As anticipated, District Court Judge Albert Coffrin denied VNRRC's request for an injunction to halt construction of Interstate 93 near St. Johnsbury. VNRRC, Green Mountain Grange No. 1, the Vermont State Grange and four St. Johnsbury area farmers have appealed to the Second Circuit Court of Appeals in New York City. The Appeals Court recognizes that construction is proceeding rapidly on the 11-mile-long segment of the highway and has agreed to expedite the case. A hearing is scheduled for Friday, June 6th.

VNRRC has argued that there are routes for the road which would do far less damage to operating dairy farms. At the trial, Dr. Robert Morris, a transportation planner, testified that alternative routes around the farms were feasible from engineering and environmental standpoints. By not studying any routes but the one under construction, the highway planners violated the National Environmental Policy Act and the Federal-Aid Highway Act.

If VNRRC prevails in the Court of Appeals, the Vermont Agency of Transportation and the Federal Highway Administration will have to hold hearings to assess the agricultural impact of the proposed route. VNRRC believes that the damage to agricultural land and other effects of the highway were fully disclosed to the public and if alternatives were presented, Federal and State decision-makers would not proceed as planned.

Meanwhile, Vermont's Agency of Transportation has allowed bulldozers to begin scraping away the rich topsoil on the Ginge farms in spite of Judge Coffrin's warning that they may have to restore the land to its original condition if VNRRC wins the appeal.

(The photo below by Robert Platt shows a barn belonging to Joe and Pauline Ginge. The white stave in the foreground marks the 1-93 right-of-way).

The 1980-1981 Vermont General Assembly

The Legislative Action Committee coordinated VNRRC's lobbying efforts this year. The Committee concentrated on agriculture, energy and natural resources. Members analyzed and followed bills, provided testimony before House and Senate committees, and worked with the Endangered Species Coalition and the Clean Air Coalition.

Agriculture. The most significant pieces of agricultural legislation this session were the "right-to-farm" law and the institutional marketing law. H.345, the "right-to-farm" law, protects reasonable farming activities from lawsuits based on the nuisance theory, but it does not bar municipal ordinances governing farm machinery operation, manure-spreading and other practices. H.138, the institutional marketing law, requires that state institutions purchase Vermont farm products if they are of comparable quality and price and if there is a dependable supply.

More substantive agricultural revitalization and protection efforts included bills to block construction of I-93, make possible purchase of development rights to farmland, identify prime agricultural land, aid in obtaining credit for farm acquisition, create an agricultural development authority and assess the economic value of Vermont's agricultural production. Many of the bills were flawed, and none had the wholehearted support of farm organizations, the Agriculture Department and environmental groups. Agriculture Commissioner George Dunsmore has organized a study group which will attempt to assemble a comprehensive agricultural enhancement package for consideration by the second session of the biennium.

Energy. No significant new energy legislation emerged, but several key appropriations breathed new life into existing programs.

The Representative Anne Just's bill to do a demonstration size of the Home Energy Audit Program died early in the session. A substitute request for $157,000 to make up for a one-third cut in Federal funding and maintain the program at its present level was whittled down to $100,000 before it was passed and signed by the Governor.

H.370, passed by both Houses, authorizes the Mortgage Guarantee Board to guarantee loans of up to $7500 for energy conservation and related purposes and raises the total amount of guarantee authority.

H.352, an Energy Committee bill, languished in the House Appropriations Committee. It would have appropriated $200,000 from the General Fund to the Vermont Housing Finance Agency to authorize up to $5,000,000 in low interest loans for residential energy conservation and conversion to alternate energy sources.

One of the most promising energy bills of the session needed no appropriation. H.220 would have required electric utilities to demonstrate that they had used all reasonable measures to improve the efficiency of their procedures and to assist customers in energy conservation before they could be granted a permit from the Public Service Board to construct additional facilities. It died in the House Energy Committee, but Committee members expressed hope that it could be resurrected next session.

Clean Air Act Resolution. VNRRC and other members of the Vermont Clean Air Coalition successfully supported a resolution calling upon Vermont's Congressional delegation to play a leading role in securing reauthorization of the Clean Air Act and enhancing its ability to regulate acid rain. The resolution sailed through both Houses with only minor changes in wording. It was the only strictly pro-environmental action on the part of the 1980-1981 General Assembly.

Endangered Species. The beleaguered Endangered Species Bill came out of the Senate Agriculture Committee and passed the Senate late in the session. The Agriculture Committee added several amendments reducing the power of the Environmental Secretary and changing the composition of the Endangered Species Committee (which recommends additions and deletions to the list of endangered and threatened species). The Endangered Species Coalition decided not to push the bill this year but to wait until next session with the hope of obtaining more thoughtful consideration from the House Natural Resources Committee.

Chapter 117 Revisions. VNRRC Attorney Darby Bradley is working with a committee of regional and State planners and members of the House Natural Resources Committee on bills to revise Vermont's Municipal and Regional Planning and Development Act. Two bills were introduced this session: a priority bill dealing with topical issues in regional and town planning and an omnibus bill involving substantive changes in the law. The priority bill passed the House and is now before the Senate Committee on Energy and Natural Resources, where it will remain over the summer.
Commentary

There is More to Wind Power than Wind

Lester Anderson

The Department of Energy's giant wind turbine test program has been dropped from the Reagan Administration's budget. Further, an article in a recent issue of the meteorological tower that was to determine the suitability of wind on Lincoln Ridge in Lincoln County, New Hampshire, the Green Mountain Power Group (GMP) which proposed the Lincoln site to the government, says that it will not be constructed without Federal financing. As a first step, the utility will set up its own meteorological tower if the Forest Service grants a permit.

So far, whether or not the project makes sense as a whole, economically, environmentally, technologically and aesthetically has not been considered as part of the permit process. The GMP insists that the pros and cons of a test tower on Lincoln Mountain cannot be considered until wind conditions have been monitored by the met tower.

An article in a recent issue of the Vermont Environmental Report, Professor Richard Mixter said there must be a study of wind conditions before the turbine can be designed for Lincoln Mountain and that no intelligent decisions can be made about the site without such an evaluation. But the Save Lincoln Mountain Committee believes that certain aspects of the Lincoln Ridge site are at least as important as its wind power potential. Furthermore, since we know the design parameters of the large and medium-sized turbines on the market, we can project probable environmental impacts and related problems of access and construction. What we know about climate, fog and icing and their predictable effects raises questions as to why this site was considered at all.

Professor Mixter says in his article that, "in order to determine the best machine for a particular site, or conversely, the best site for a particular machine, the basic data must be available. The design engineer cannot plan the wind turbine generator without knowing what the winds are and how they work." This implies that wind turbines are designed to meet site-specific conditions. In fact, one of the goals of the aero-space companies is to develop giant wind turbines that can be mass-produced for application at a wide range of sites.

At a meeting last June in Waitsfield, DOE representatives said that the approach of the R and D contracts with the aerospace firms is to develop machines which will be economical over as broad a span as possible... machines are designed to a hypothetical set of specifications and the final analysis is done after site selection."

In short, the goal is a standard design, with component options and fine-tuning dependent on conditions at the user's site. The object of a meteorological tower is to find locations where the winds fit these hypothetical specifications.

There are already designs and prototypes for turbines that could go on Lincoln Mountain. The range of the machines and their structural masses are known, and their impacts are predictable. This article concentrates on the larger machines, since the larger turbines are more economically attractive, but similar issues are involved in constructing a cluster of smaller machines.

FIGURE 1: COMPARATIVE DIMENSIONS OF MULTI-MEGAWATT WIND TURBINES UNDER TEST OR DEVELOPMENT

<table>
<thead>
<tr>
<th>Nominal Rated Power</th>
<th>Tower Height</th>
<th>Rotor Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOD-1*** 1.5MW</td>
<td>140 ft</td>
<td>200 ft</td>
</tr>
<tr>
<td>MOD-2* 2.5MW</td>
<td>200 ft</td>
<td>300 ft</td>
</tr>
<tr>
<td>MOD-5* 5MW</td>
<td>250 ft</td>
<td>400 ft</td>
</tr>
<tr>
<td>Hamilton-Standard 3&amp;4MW</td>
<td>200 ft</td>
<td>260 ft</td>
</tr>
<tr>
<td>Mehran Energy</td>
<td>120 ft</td>
<td>130 ft</td>
</tr>
<tr>
<td>Development Corp.</td>
<td>110 ft</td>
<td>166 ft</td>
</tr>
<tr>
<td>Bendix</td>
<td>110 ft</td>
<td>166 ft</td>
</tr>
</tbody>
</table>

Sources: Electric Power Research Institute, NASA, DOE
* Government-financed machines. Their future is uncertain.
**The MOD-1 machine at Boone, North Carolina, is currently inoperable because of 22 sheared drive-shaft bolts.

Some of the characteristics of the larger machines are shown in Figure 1. To be cost-effective, the large machines require a mean annual wind speed of around 14 miles per hour. But even under ideal wind conditions, ice will reduce performance. The MOD-2 turbine shuts down when 0.5 inches collects on the blades, and does not start up again until the ice is gone. The blades can be heated to remove the ice, but this reduces net power output and increases costs. NASA estimates that the MOD-2 tower can withstand five feet of rime ice in a 100 mph wind. But WCAX engineers state that four to six feet of rime ice is a typical accumulation on their television tower on Mt. Mansfield, and up to 12 feet and other heavy vehicles, including earth-moving equipment. Professor Mixter says "a construction way need be only 10 feet with a cleared area 20 feet wide," but construction engineers scoff at the idea of building and servicing a 25- to 30-story-high piece of machinery without a substantial all-weather road. Would the Forest Service condemn part of Sugarbush for such a road?

And is this in any way a "compatible use" of the National Forest? We are in an area where ice has build and maintain the turbines, it is just the beginning. Professor Mixter understates the problem when he says that the total land and area disturbed is about two acres. Whenever a mountain area is cleared, the trees surrounding the clearing die back in a widening periphery. This is evident around the upper towers on the steep slopes of the Mt. Mansfield range where the "dieback" area substantially exceeds the cleared area.

A large safety zone was originally prescribed for the mega-scale wind turbines but it was pared down as confidence in machine integrity grew. However, if a row of turbines were constructed on Lincoln Ridge and the safety zone would be required due to ice accumulation. According to a television station engineer, the Mt. Mansfield area would require a sizeable safety zone.

Large safety zones were originally prescribed for the mega-scale wind turbines, but it was pared down as confidence in machine integrity grew. However, if a row of turbines were constructed on Lincoln Ridge and the safety zone would be required due to ice accumulation. According to a television station engineer, the Mt. Mansfield area would require a sizeable safety zone.

One vital regulatory question remains unanswered. The Lincoln Ridge site is within Forest Service Management Area III, which precludes construction of generation equipment. It seems illogical to permit the erection of a met tower to test the feasibility of a wind turbine and then forbid generating equipment. It seems illogical to permit the erection of a met tower to test the feasibility of a wind turbine and then forbid generating equipment.

Wind power has its place in large, readily-accessible sites which can accommodate 50 to 500 machines. NASA's calculations of the cost-effectiveness of giant turbines assume a cluster of 25 production models, but the 34-mile-long Lincoln Ridge site could accommodate only about five turbines. A cluster of five machines would contribute only one percent of GMP's 1980 average peak capacity of 300 megawatts.

Conservation and load management are also promising. The Pacific Gas and Electric Company is minimizing load growth by funding low-cost loans for solar and hot water systems. In Oregon, several utilities are making no-interest loans to customers for home insulation in order to avoid building new generating facilities. In Massachusetts, utilities have formed a statewide non-profit organization which offers low-cost energy audits. Here in Vermont, the Home Energy Audit Program is saving millions of dollars by preventing the building of a large wind turbine at a fraction of the projected cost of a single commercial multi-megawatt machine.

Overall, there are many critical factors besides wind speed, direction and duration which must enter into the decision to build a meteorological tower or a wind turbine generator. We urge the Forest Service to give a careful consideration of these factors clearly reveals the insufficiency of the Lincoln Ridge site.

Lester Anderson serves on the Board of Directors of the Save Lincoln Mountain Committee.
Garbage In, Garbage Out
Landfills and Ground Water in Vermont

The "throwaway society" is one of those hopelessly overworked cliches which has lost all of its original meaning through repeated application. But the ever-increasing amount of solid waste which Americans generate and must therefore dispose of is a very real, very current problem. We are just beginning to recognize the environmental consequences of decades of irresponsible attitudes toward household wastes. The latter are the major sources of contamination of underground water supplies. This article on landfills and ground water in Vermont is the third in a five-part series prepared by the Vermont Natural Resources Council under a public information grant from the Environmental Protection Agency.

What happens when you throw something away? Where does it go? If you burn paper wastes, they give off heat and leave behind ash. Composting can make great fertilizer for next summer's garden. But what about the bottles, cans, plastic bags and small appliances which usually end up in the local landfill? A major part of their disposal involves the leaching of unnatural chemicals to ground water and to seepage from pits, ponds and lagoons.

Solid waste decomposes and makes not only good fertilizer but can be turned into a valuable vegetable oil. Domestic waste materials can be converted to usable products such as paper pulp, animal feed and fertilizer. The composition of leachate depends on what types of wastes are dumped in the fill. Ordinary household wastes contain chloride, iron, lead, copper, sodium, nitrate and a variety of organic chemicals. A landfill may be under the same conditions as long as the flow of the leachate is not sufficient to cause the release of harmful substances. A leachate may be considered as "diluted" but they do not go away when they are crushed and covered with earth. They sometimes hang around for quite a while, and if you're not careful, they can come back to haunt you.

A 1978 study by the Wisconsin Department of Natural Resources found that one-third of reported cases of ground water contamination involved landfills and leachate to seepage from pits, ponds and lagoons. The composition of leachate depends on what types of wastes are dumped in the fill. Ordinary household wastes contain chloride, iron, lead, copper, sodium, nitrate and a variety of organic chemicals. A landfill may be under the same conditions as long as the flow of the leachate is not sufficient to cause the release of harmful substances. A leachate may be considered as "diluted" but they do not go away when they are crushed and covered with earth. They sometimes hang around for quite a while, and if you're not careful, they can come back to haunt you.

The Green Mountain State has special problems because of its peculiar topography and geology. "In Vermont, you're either on the side of a mountain or in a river valley," says C. Gagne, a geologist who has studied the effects of landfills. "In the higher parts of the state, the ground water is quickly filtered through layers of sand and gravel soil deposits. In the lower parts, the ground water is filtered through layers of soil and sediment. The thin layer of crusty glacial till on a mountainside may not provide adequate separation between the landfill and bedrock aquifers, which supply much of the state's drinking water."

"Garbage is not something people want to spend a lot of time thinking about, and they certainly don't want to give over a prime piece of property to it." What good is a landfill if it causes damage to the environment? It's not good at all. But the question is, how do we get rid of garbage in a way that is both safe and effective? We need to find a better way to handle our waste, one that is both environmentally friendly and cost-effective. We need to think about the future and what it will be like for our children and their children. We need to consider the long-term consequences of our actions. We need to be responsible and make decisions that will benefit us and future generations.
New Prosperity, Old Problems in the Lake Memphremagog/St. Francis River Basin

Lake Memphremagog is 27 miles long, has shoreline in two countries, and drains an area 806 miles square. Three major tributaries flow into it, and the lake itself drains northward through a depression created by retreating glaciers.

The Burlington and Atlantic of the New England River Basin Commission, in cooperation with the Agency of Environmental Conservation and the State Planning Office, has just completed a report on water resources and related land use problems in the Lake Memphremagog/St. Francis River Basin. The report integrates existing research and knowledge and takes a "holistic" view of the potential and problems of this international ecosystem.

The following article includes excerpts and summaries from a public review draft of the report released last August. Copies of the final report entitled "Lake Memphremagog/St. Francis River Basin Overview" will be available for the public to read at the Goodrich Memorial Library and other local offices in New Hampshire, Vermont, and at the Agency for further information, write the New England River Basins Commission, 177 Battery Street, Burlington, Vermont 05401. (Note: Funding for all seven regional river basin commissions was eliminated when Congress approved the Reagan budget).

In the mid-1800s, the railroad arrived in Newport, Vermont, bringing tourists and prosperity to tourism lake Memphremagog Basin. Luxury hotels graced the Memphremagog shores and steamers plied between Newport and Magog. Trees felled in Quebec were floated down the St. Lawrence River and milled into lumber for eastern cities.

The boom collapsed toward the end of the century. Clearcutting gradually depleted the timber supply. In the 1920s, which it did in the rest of Vermont. Tourism dropped off sharply as better transportation brought northeasterners to other previously remote areas. Among the setbacks the Vermont portion of the basin declined steadily from 1990 to a low of 17,683 in 1970.

The Basin area still lags behind the rest of Vermont in per capita income and employment. In 1977, the average yearly income for people in the Vermont part of the Basin was 17% less than that of other Vermonters and 32% less than that of the average U.S. citizen. Unemployment in 1979 was 7.2% compared with 6.2% for the rest of the state. Population density averages 32 people per square mile compared with 48 per square mile statewide. In the 1950s, population began to increase due to a turnaround in the Basin's economy. The economy of the Lake Memphremagog/St. Francis River Basin has traditionally depended on natural resources -- farming, forestry and outdoor recreation -- but manufacturing is playing a more significant role today. Employment in a variety of manufacturing industries increased in the 1950s. By the year 2000, the number of people living in the Vermont part of the Basin is expected to increase by about 80%.

Accelerated population growth will increase the pressures on land and water resources. But unemployment and low per capita income combined with a strong local tradition of fiscal conservatism will create obstacles to water resource projects.

FLUCTUATING LAKE LEVELS

Human beings have manipulated the level of Lake Memphremagog ever since Indians constructed a boulder dam on the Magog River 200 years ago. Today there are 28 dams in the Vermont part of the Basin serving a variety of purposes including flood control, hydroelectric generation and water supply.

The single most important dam in terms of its effects on the Basin's hydrology is a dam owned and operated by the electric generating company, Inc., in Magog, Quebec. There has been great controversy surrounding the company's management of the dam, and, consequently, the level of Lake Memphremagog.

A 1935 international agreement sets minimum and maximum levels for the lake and allows a fluctuation of slightly less than four feet. But lakeshore residents claim that the dam holds the lake too high in the spring, contributing to shoreline erosion, and that the level is undependably regulated in the summer, creating problems for navigation, boating access and beach use. High lake levels also reduce the generating capacity of hydroelectric dams on the Magog River and produce water quality standards downstream.

Low levels are a threat to wetlands and other critical habitat areas.

WATER QUALITY

Water quality in the Memphremagog/St. Francis River Basin is generally good. There is, however, some localized degradation due to municipal, agricultural and individual waste discharges. hamburger in the Basin, 87 miles have been affected by municipal/industrial waste discharges. The rivers also carry significant phosphorous loads which accelerate the lake's natural aging process. Nearly 20% of the Basin lakes are in the early stages of eutrophication, while just over 40% of the lakes are already eutrophic.

Lake Memphremagog itself is eutrophic at its southern end, and recent research indicates that 84% of the phosphorous and 58% of the nitrogen enter the lake near Newport. Improved central sewage treatment systems are essential, but the pace of designing and constructing needed facilities has been slowed by changing governmental regulations over the past few years as well as by the reluctance of local communities to agree to finance the projects.

Other sources of phosphorous and sediment include swine confinement and other livestock, and passenger and pleasure boating. Over 75% of the farms in the watershed need improvement in manure handling and storage. Among lakes, 65% of the lakes don't have satisfactory milkhouse waste disposal systems.

FISH AND WILDLIFE RESOURCES

Fishing is an important part of the economy of the Lake Memphremagog/St. Francis River Basin. It contributed over $4 million to total expenditures in Orleans County in 1975. But the overpopulation of Lake Memphremagog fish, especially trout, has resulted in spawning habitat in four Vermont tributaries which drain into the southern end of the lake. The Clyde, Barton, Black and Johnn Rivers have received protracted, frequently toxic, and destructive treatments to their currently used water quality standards.

The Clyde River is home of a species of landlocked salmon unique to Lake Memphremagog.

Salmon may have first stocked in the Clyde River in 1899, but the species declined in the 1940s when hydroelectric power plants on the lower Clyde began creating extreme variations in water levels and stream flow critical to generate peaking power. Landlocked salmon were reintroduced in the mid-1970s. The results to date have been encouraging, but the success of the program depends on maintaining minimum stream flow and preventing the passage of migrating fish around dams on the Clyde River.

Fish and game personnel as well as local environmentalists are concerned about the encroachment of development on wetlands along Lake Memphremagog. A 1979 VNRC study identified 191 wetland areas totaling 9794 acres in the Lake Memphremagog/St. Francis River Basin, but water level fluctuations and the lack of protective legislation could affect these important fish and wildlife habitat areas.

OTHER WATER RESOURCE ISSUES

The water resources of the Lake Memphremagog/St. Francis River Basin must serve many overlapping and sometimes conflicting interests. There are no figures on how much money swimming, boating and sight-seeing bring into the area, but many people agree that outdoor, water-oriented recreation plays an important role in the economy of the Basin, both in Quebec and Vermont. Obviously, water quality and lake level fluctuations directly affect these activities.

Low water levels in Lake Memphremagog also create problems for the cities of Sherbrooke and Magog, which together take 17.6 million gallons per day from the lake. More and more Basin communities are turning to ground water for municipal water supplies, but if population projections are accurate, there will be a severe shortage. The Derby area. Inappropriate land use and development could create contamination problems in aquifers around Lake Memphremagog and Sault-Sainte Marie because of the character of the soils.

Hydropower from dams on the Clyde River supplies about 3200 kilowatts at 12.6% of the peak power output drawn by people in the Vermont part of the Lake Memphremagog/St. Francis River Basin. Local utilities purchase the rest from other sources, mostly Hydro Quebec, PAPA and others, at very low rates.

The uncertainty of the Hydro Quebec and PAPA agreements leaves area residents vulnerable to shortages and price hikes, but further development of local hydropower resources is unlikely. According to an NERBC study, only a few local sites could economically generate appreciable amounts of electricity. Local residents could reduce their dependence on out-of-state power by reducing consumption and by relying more heavily on small-scale energy systems such as wood heat.

Since the headwaters for Lake Memphremagog are in Vermont, problems there affect the entire lake. But a dam in Magog controls the water level, and its operation directly affects landowners and others who use the lake in the United States and Canada. Though two countries share the lake, the Vermont and Quebec lakeshore residents make up one community. The authors of this report call for international cooperation and coordination of water resource and related land use problem-solving. The Agency for Environmental Conservation should support ecological, environmental and environmental resource studies including the effects of lake level fluctuations on shorelines, recreation, wetlands, fisheries and wildlife habitat. Vermont also needs a role in water protection plan, minimum streamflow and wetland protection legislation, and public financing for shoreline erosion control measures on Lake Memphremagog.
The Council

MEMBERSHIP SURVEY RESULTS:

WE'RE GETTING YOUNGER, BIGGER AND MORE INVOLVED

VNRCS mailed out its first membership survey in six years in January, and the results have been pouring into our offices as rapidly as membership renewals! In all, 521 households responded in time to be tabulated by the computer.

The response to a request to rank environmental issues in order of importance underlined the Council's long-standing interest in agricultural land preservation. 28% of the respondents said farmland conservation was the most critical environmental issue. Six years ago, 32% of the survey respondents placed farmland protection at the top of their lists, anticipating by several years widespread public recognition of the importance of this issue.

Almost 34% said that land use in general was the all-important issue. Six years ago, 31.5% said that "regulation of development" was the top issue.

Energy and water pollution ranked well below land use issues at 16% and 13%, respectively. Six years ago, energy and water pollution were pegged as the most critical water issues, acid rain was labeled as the key air quality problem and habitat was far and away the most significant wildlife issue. Survey respondents viewed solar energy development and radioactivity as key energy issues. Six years ago, solar energy was seen as the key energy development issue.

Turning to the characteristics of VNRCS's membership, the survey confirms that the Council is indeed getting younger. There were far more members under 35 years of age in 1993 than there were six years ago. Educational experience was similar to the first survey with over half of the respondents indicating that they hold graduate degrees.

One-fifth of this year's survey respondents live in Chittenden County, followed by Washington, Windham, Windsor and Bennington. Almost 40% of those responding have lived in Vermont five to nine years. Predictably, most said they had moved to Vermont to achieve a desired lifestyle, and environmental quality was the next most popular reason.

Well over half the respondents said that influencing environmental legislation was the Council's most important activity; the Environmental Law Service was a distant second.

The vast majority said the new Vermont Environmental Report is better than its predecessor and almost 80% said they thought it well of our pre-tax reform methods.

We were encouraged by the number of members who said they were willing to put their skills and knowledge to work for VNRCS. We plan to follow up on many of these offers, particularly once the Board of Directors completes its five year plan for the Council.

Most of the survey questions used an "either/or" format. The limitations of this format make it difficult to interpret the survey results, but VNRCS's Planning Committee is studying the survey data in depth. We'll keep you posted on their work and on how the Board responds to the new information.

Many, many thanks to all those who took the time to respond to the questionnaires.

-Vernon Weber

VNRCS'S 19TH ANNUAL MEETING, featuring our usual magnificent mixture of fascinating field trips, sparkly speakers and brisk business, will be held on Saturday, September 12th, in the St. Johnsbury area. Watch future VFRs for further information on the day's events.

CONFERENCE CALLS FOR COMMUNITY ENERGY PLANNING

"If we don't invest in conservation, our communities will go bankrupt, and so will we." This was the theme of a March 20th Community Energy Planning Conference in Montpelier as presented by keynote speaker Jim Benson. Benson, a former Division head of the Energy Research and Development Office and current Director of the Institute for Ecological Politics, is one of the main architects of the "soft energy path" theory. In his two books, Energy and Power in Your Community and County Energy Plan Guidebook, he argues that energy conservation and development of renewable resources (the soft approach) is not only less expensive and less environmentally-damaging, but that it creates more jobs than large investments in nuclear power, coal and synthetic fuels (the hard path).

Benson claims that many Vermont communities spend 85-90% of their funds on energy from outside sources. Statewide, we send as much as $570 million each year out of the state for energy purchase. Investments in conservation can substantially reduce this drain on local resources and help ensure a secure economic future.

Margaret Garland, Director of the State Energy Office, also spoke of the critical need for community energy planning. She told the audience that there will be far less help from the Federal Government in making and the local government must work together on energy development and conservation issues.

Several other speakers addressed the day-long conference on subjects ranging from implementing town energy plans to preparing for energy emergencies.

-Robert Howland

NEW COMMITTEES ARE HIGHLIGHT OF SPRING BOARD MEETING

Last summer, in an effort to stimulate greater Board participation in Council activities, Chairman Carl Reidel increased the number of Board committees and gave them responsibility for special project programs. The Spring Directors' meeting was the first chance for these committees to show their stuff. After a morning of committee reports, it was generally agreed that the committees were working hard and focusing on important issues.

The most significant decision of the Board was to explore opportunities for the Council to become more involved in the field of environmental health. Richard Brooks, Director of the Environmental Law Center at the Vermont Law School and a member of the Council's Planning Committee, said that this field will become an increasingly important part of environmental enhancement and protection. The Board endorsed a motion to cooperate with Brooks and the Law Center in determining the feasibility and the need for VNRCS to make environmental health issues a significant part of its work program.

The nominating committee reported that it planned to offer a single slate of nominees for at-large members of the VNRCS Board for consideration at the Annual Meeting. It also proposed two amendments to the by-laws which were accepted by the Board for consideration by the membership at the Annual Meeting.

-Seward Weber

VNRCS BOARD CALLS FOR NOMINATIONS

Each year, VNRCS singles out several individuals, businesses or agencies for their outstanding service to the state's environment. You can help by nominating candidates for this distinction. Send your nominations to Seward Weber, Secretary, VNRCS, 7 Main Street, Montpelier, Vermont 05602. Please give us your telephone number in case we need more information.

The VNRCS Board is also looking for new members. Four at-large and two organizational members will be elected at the Annual Meeting. Council members can nominate candidates for the four at-large positions until August 12th, 30 days before the Annual Meeting. Please send your nomination to the Secretary of the VNRCS Board as soon as possible so that biographical information can be included in the July/August issue of the Vermont Environmental Report.
Clean Air
(Continued from Page One)
- ozone: Chittenden County, Addison County, Washington County
- carbon monoxide: Winooski City, Essex Town, Essex Junction, Burlington, South Burlington
- TSP: Essex Town, Essex Junction, Burlington, South Burlington, Winooski, Barre City
Each state with non-attainment areas must develop a strategy for reducing the release of pollutants from existing and new sources. This plan, called the "State Implementation Plan," includes an inventory of emissions, estimates of the reductions needed to meet the standards, and a program designed to achieve the reductions. AN OUNCE OF PREVENTION...
Because most of Vermont is "attainment," the heart of the Air Program's effort is prevention. Through the "Prevention of Significant Deterioration" program, Vermont's Air Program uses a key feature of the Clean Air Act designated to prevent clean air from becoming polluted. A permit system requires that new sources demonstrate that their emissions will not contribute to concentrations of air pollutants exceeding EPA limits. Under PSD, there is a "budget" (called an "increment") for allowable pollution. Pollution from new sources is permitted only up to the point where the "budget" is spent. Once that point is reached, new pollution permits can be granted unless an existing source reduces its emissions.
Another major feature of the Act is the New Source Performance Standards. The NSPS require that all major new pollution sources, whether they are in attainment or non-attainment areas, meet specific minimum pollution emission standards. These standards, established by the EPA on an industry-by-industry basis, attempt to maintain air quality and economic growth while minimizing emissions from new plants and forcing industries to develop new pollution control technology.
There are some areas of the Act which need fine-tuning. Several environmental groups, organized as the National Clean Air Coalition, have pinpointed the following problems which they believe need attention during the year's Congressional deliberations:
- Fine Particles: The TSP standards are weighted toward heavy particles. Particles smaller than 2.5 microns (1/10,000 of an inch) include sulfates, nitrates, toxic organic compounds and trace metals. They are the most dangerous air-borne pollutants because they are inhaled deeper into the lungs and are often absorbed into the bloodstream. They also affect vegetation, aquatic life and visibility, and they are a component of acid rain.
- Toxic Air Pollutants: As many as 10% of all cancer cases result from toxic air pollutants. Although the chemical and synthetic industries grow, exposure to airborne toxics will increase. The EPA has the authority to control toxic pollutants, but so far, only asbestos, beryllium, mercury and vinyl chloride are subject to EPA regulations.
- Acid Precipitation: Environmental Secretary Brenda Whitaker has described acid precipitation as "the environmental problem of the eighties." Existing legislation cannot control the sources of this killing rain, which blows in from the industrial areas of the midwestern and mid-Atlantic states.
The National Clean Air Coalition wants to fine-tune the Act; industries, on the other hand, are presenting a platform designed to fundamentally alter the instrument. They are concerned that the cost of reducing pollution emissions will interfere with the Reagan Administration's so-called "reindustrialization" program. They have proposed a cost-benefit approach to air pollution control. Simply put, the battle ahead will be over whether the Clean Air Act should place a premium on public health and the integrity of our environment, or weigh environmental and health benefits against industry profits.
The cost-benefit approach to environmental protection, supported by the Reagan Administration and many industry leaders, downplays the costs of air pollution to crops, water resources, timber and buildings, and the cost to our health care system associated with illness and disease caused by polluted air. It also requires the Federal Government to assign a monetary value to human life and health. Congressman Henry Waxman, Chair of the House Subcommittee on Health and the Environment, recently asked the National Clean Air Coalition, "What kind of society would we have when we would allow people to die, children to be born with defects or brain damage in order to maximize the profits from a power plant?"
THE VERMONT CLEAN AIR COALITION
In response to the National debate over the Clean Air Act, a coalition has been formed here in Vermont with the twin goals of educating Vermonters about the importance of clean air and demonstrating public support for a strong Clean Air Act. The Coalition, which currently includes the Vermont Public Interest Research Group, the Vermont Natural Resources Council, the Vermont Lung Association, the Sierra Club, the League of Women Voters, Friends of the Earth and the Audubon Society, is developing position papers on key issues, scheduling discussions and public appearances to raise awareness of the Act, and meeting with Vermont's Congressional delegation.
Until now, air quality has not been perceived as a major issue in this state, perhaps because Vermont has relatively clean air. But acid rain is eating away at our soils, crops and water resources. Furthermore, we should not forget that our air is as clean as it is principally because of the Clean Air Act. Its reauthorization and the addition of provisions regulating long-range transportation of pollution, are critical to our future air quality.
Vermont can play a key role in the reauthorization of the Clean Air Act. Our senior Senator, Robert Stafford, chairs the Senate's Committee on the Environment and Public Works, which has jurisdiction over the Act. Stafford recognizes the importance of the Act to public health and has said that its "fundamental provisions are sound" and "should not be tampered with."
Stafford has not announced his position on the cost-benefit approach to air pollution control, which he has heard from Senator Leahy or Congressman Jeffords. But that could be because they haven't heard from us. Readers of the VER are urged to write their Congressional representatives about this important environmental and health issue. Their addresses are:
- Senator Robert Stafford
  Room 5219
  Dirksen Senate Office Building
  Washington, D.C. 20510
- Senator Patrick Leahy
  232 Russell Building
  Washington, D.C. 20510
- Congressman James Jeffords
  1510 Longworth
  Washington, D.C. 20515
- Jeanne Keller is the Director of the Vermont Public Interest Research Group.

Vermont Environmental Report

Vermont Natural Resources Council
7 Main Street
Montpelier, VT 05602

May/June 1981