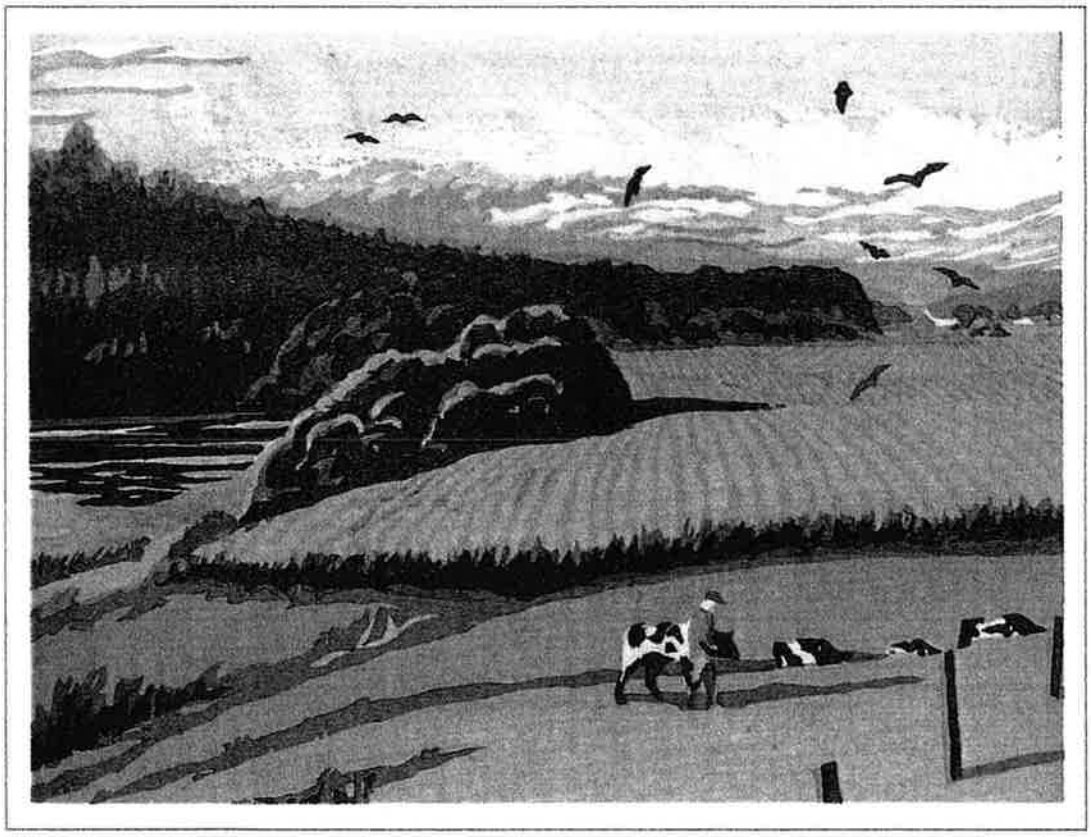
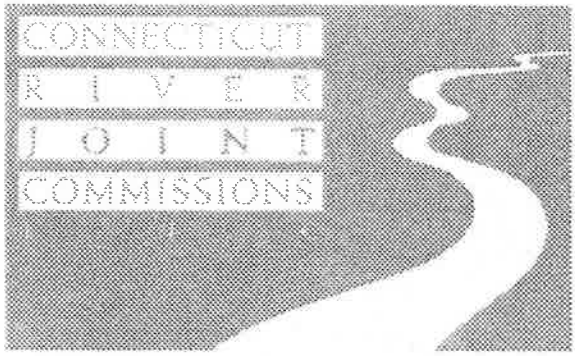
CONNECTICUT RIVER
Corridor Management Plan



Volume III

Riverbend Region

CONNECTICUT RIVER
Corridor Management Plan



Volume III
Riverbend Region

Prepared by
Riverbend Region Local River Advisory Subcommittee
Edited by
Adair D. Mulligan
of the Connecticut River Joint Commissions

Prepared for and dedicated to the Connecticut riverfront towns of:

Lancaster, Dalton, Littleton, Monroe, Bath, and Haverhill,
New Hampshire

◆

Guildhall, Lunenburg, Concord, Waterford, Barnet, Ryegate, and Newbury,
Vermont

VOLUME I:
Riverwide Overview
VOLUME II:
Headwaters Region
VOLUME III:
Riverbend Region
VOLUME IV:
Upper Valley Region
VOLUME V:
Mt. Ascutney Region
VOLUME VI:
Wantastiquet Region

Connecticut River Joint Commissions
P.O. Box 1182 ◆ Charlestown, New Hampshire 03603
Telephone: 603-826-4800 ◆ Fax : 603-826-3065

June 1997

Printed on recycled paper
This material may be photocopied without permission.

Cover illustration by
Matt Brown of Lyme, New Hampshire
"Riverbend Farm"

TABLE of CONTENTS

- *INTRODUCTION*
  - *A Citizens' Plan for the River* — 1
    - Origin of the Plan — 1
    - Plan Participants — 2
    - Plan Process — 3
    - Adoption of the Plan — 4
    - The Connecticut River Joint Commissions — 5
- *THE RIVERBEND REGION* — 6
  - *Map* — 7
- *WATER QUALITY* — 8
- *FISHERIES & AQUATIC HABITAT* — 16
- *SHORELAND & UPLAND HABITAT* — 21
- *RECREATION* — 27
- *AGRICULTURE* — 35
- *FORESTRY* — 43
- *HISTORICAL & ARCHEOLOGICAL FEATURES* — 47
- *APPENDICES* — 52
  - *Acknowledgments* — 53
  - *A.* New Hampshire Rivers Management & Protection Act (RSA 483) — 55
  - *B.* New Hampshire Comprehensive Shoreland Protection Act (RSA 483-B) — 58
  - *C.* River Recreation Studies — 59
  - *D.* Selected Best Management Practices — 61
  - *E.* Forest Practices and Guidelines — 65
  - *F.* Present Town Regulations Regarding the River — 66
  - *G.* Tools for Protecting Water Quality and River Shores — 68
  - *H.* Conservation Easements — 70
  - *I.* Guide to Permits — 72
  - *J.* Sources of Assistance — 74
  - *K.* Riverbend Region Subcommittee Members — 76

A CITIZENS' PLAN FOR THE CONNECTICUT RIVER

The Riverbend Region's plan provides a blueprint for stewardship of the Connecticut River...for communities, landowners, businesses, and agencies on both shores. This plan was created by local citizens who know their town and the Connecticut River, not by state or federal agencies. Gathering together to create this plan for the Riverbend segment were representatives from this region's riverfront towns, where New Hampshire and Vermont meet across the Connecticut River.

The Riverbend Subcommittee believes firmly in the right of each citizen to use and enjoy both his own property and the Connecticut River, and that the most effective protection of the river has come and will continue to come from local landowners.

Because the actions of a private landowner can affect the quality of both public waters and private property downstream, the Riverbend Subcommittee believes that it is appropriate for all landowners to participate as caretakers of the river for the benefit of themselves and their neighbors. Private landowners can voluntarily be a big part of both problems on the river and their solutions.

Communities can and should also take action to keep the Connecticut River the valuable economic and environmental resource that it has long been to their citizens. This plan encourages continued economic development that is compatible with the well-being of the river.

Linked together as we are by the river, our care of the river should be coordinated - between towns, between states, recruiting all the players that affect the river. This plan provides a way for these players to work together as a team.

This plan is not an attempt to dictate to citizens and towns what they can and cannot do on the banks of the Connecticut River. Instead, this plan aims to stimulate stewardship and build partnerships across town lines, across the river, and among the many interests of those who live and work on its banks.

ORIGIN OF THE PLAN

Seeking a local avenue for river decision-making, the Connecticut River Joint Commissions (CRJC) mobilized hundreds of valley residents and local officials to nominate the Connecticut River into the New Hampshire Rivers Management and Protection Program in 1991-2. Designation of the river allows local design of the river corridor management plan. Working groups of local citizens proposed designations to portray the character of each part of the river, which would then guide communities and the State of New Hampshire as they considered actions that could affect the river.

The majority of this segment is designated as a *rural river*. One two-mile section around the breached Wyoming Dam in Northumberland is designated as a *community river*, along with five shorter sections in the vicinity of the other existing dams, as shown on page 6. More information about the New Hampshire Rivers Program can be found in Appendix A.

PLAN PARTICIPANTS

To ensure local leadership in implementing the New Hampshire Rivers Management and Protection Act on the Connecticut River, the CRJC established five advisory local river subcommittees, with the approval of the New Hampshire legislature. The Vermont legislature in turn directed its riverfront communities to participate on these subcommittees. The CRJC asked the selectmen of all riverfront towns for nominations, and appointed up to two members and several alternates from each of the 53 New Hampshire and Vermont towns. Some 150 citizens have thus participated in the subcommittees' work.

"If this plan echoes a shared vision of the people in the corridor, it has has much grassroots credibility as any plan I have ever seen."

Cleve Kapala, New England Power Company

Duties of the local subcommittees

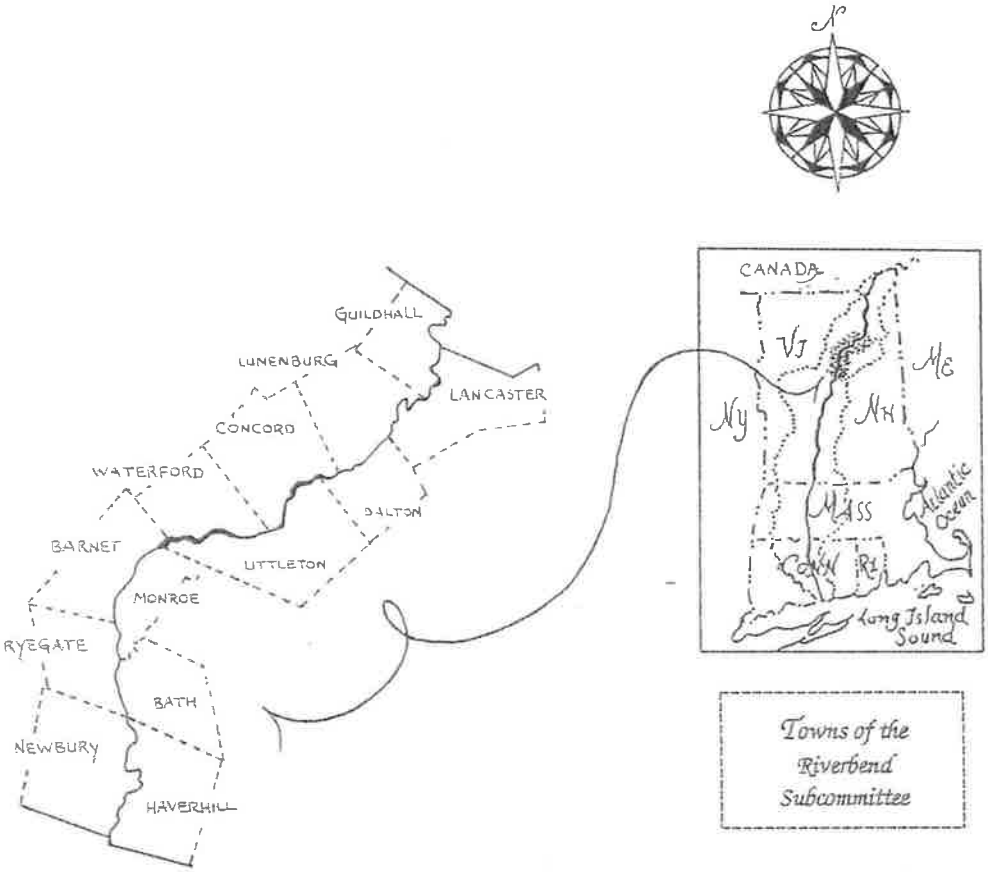
Creation of a river corridor management plan has been the primary duty of the local subcommittees, delegated to them by the CRJC so that the plan could best respond to the changing character of the river and the varying interests and needs of valley citizens. The subcommittees are also empowered by RSA 483 to review and advise state agencies on permits and other decisions that can affect the river, so that the states can make these decisions with better understanding of local points of view. The subcommittees, like the Commissions, have no regulatory authority nor ability to approve or deny permits. Their leadership, planning, and expertise are local in nature, but their ideas now reach far beyond town boundaries as they advise the CRJC and state and federal agencies on river issues.

Riverbend Subcommittee

The strength of the Riverbend Subcommittee's planning process lies in the diversity of its membership. These citizens, as directed by RSA 483, represent local business, local government, agriculture, recreation, conservation, and riverfront landowners. The Subcommittee also includes a member who manages Comerford Dam for New England Power Company. Therefore, the group is truly reflective of the region, representing many perspectives from both sides of the river.

The Riverbend Subcommittee covers the New Hampshire towns of Lancaster, Dalton, Littleton, Monroe, Bath, and Haverhill, and the Vermont towns of Guildhall, Lunenburg, Concord, Waterford, Barnet, Ryegate, and Newbury.

All of the recommendations of the Riverbend Subcommittee's plan represent the consensus of this diverse group of citizens.



PLAN PROCESS

The Riverbend Subcommittee has met monthly since January of 1993 to develop the Connecticut River Corridor Management Plan for this section of the river. The Subcommittee elected its own leadership and adopted rules of procedure. Meetings are always open to the public and have been held at the Littleton Community House on the fourth Thursday evening of the month. The CRJC Communications Coordinator, who managed the five subcommittees' communications with each other, the CRJC, and various state agencies and organizations, transcribed the Subcommittee's discussions to construct drafts of the plan, which the members revised and approved.

Striving for an objective, balanced way to evaluate the challenges and opportunities presented to the Subcommittee, the group has used the Holistic Resource Management Planning Process in reaching its recommendations. This process puts each activity or tool through a series of tests which help the group understand whether it is environmentally and economically sustainable.

The Subcommittee members have discussed a number of topics important to the river and the region. These are presented in the following chapters. For each topic, the Subcommittee has tried to identify current and potential problems, as well as opportunities, and has made recommendations which it believes represent a positive, consensus-based response to these problems. In many cases, recommendations for action in one chapter are repeated in another. For example, actions taken by farmers to save money on fertilizer can also improve water quality and benefit fisheries and recreation at the same time.

Scope of the plan - the river corridor

The Subcommittee has concentrated its planning upon the 70 miles of the Connecticut River in this segment, and the land adjacent to the river. RSA 483:4 defines the river corridor as "the river and the land area located within a distance of 1,320 feet of the normal high water mark or to the landward extent of the 100 year floodplain as designated by the Federal Emergency Management Agency, whichever distance is larger." While the recommendations of this plan are directed primarily toward this area, the Subcommittee believes that their consideration on a more general scale could benefit the river, its tributaries, and the region as a whole. Some recommendations would be effective to apply only within a short distance from the shore, but others are more broad in nature. For example, the recommendation to improve funding for cost-sharing assistance to farmers for conservation practices will benefit farmers and water quality of the Connecticut River whether it reduces nonpoint pollution on a riverfront farm or on an upland farm drained by a tributary stream.

The Subcommittee has elected to recommend no specific setbacks but defers to the individual towns to set wisely the scope of the river and shoreland conservation measures they adopt. Please refer to Appendix F, Present Town Regulations Regarding the River, and Appendix G, Tools for Protecting Water Quality and River Shores, for more information on this topic. Appendix A describes the RSA 483 designations of the various segments in the Riverbend Region, and the law's guidance for towns with respect to each designation.

A broader view

Many of the plan's recommendations are aimed beyond town boundaries, toward state and federal agencies. While the Subcommittee strongly prefers local solutions to local problems, it also recognizes that caring for such a big river is a big job and important public duty, and that help from beyond the watershed is sometimes appropriate. Therefore, this plan is intended to guide these agencies in providing help where it would be most welcome and useful. The CRJC pledge to honor the work of the local river subcommittees by pursuing the state and federal actions they recommend.

The CRJC also offer an overview of the issues and opportunities raised by the local groups, to bring a riverwide perspective to the plan. This overview is presented, along with summaries of the five subcommittees' work, in Volume I of this series.

ADOPTION OF THE PLAN

It is the goal of the New Hampshire legislature through RSA 483 to empower each New Hampshire Connecticut riverfront community to adopt a locally-designed means of caring for the river and its shoreline. The legislature sought also that "the scenic beauty and recreational potential of [the Connecticut River] shall be restored and maintained, that riparian interests shall be respected" without preempting the land zoning authority already granted to the towns.

Each town must choose its own measures to ensure that future development happens in a way that will not harm the river, measures that reflect the character of each town's part of the river and expected land uses. This plan provides a toolkit to help towns and landowners keep the river the valued resource it still is.

The mechanism for adoption of this plan is the conventional local planning process. Planning boards and commissions can review the plan and adopt it as an adjunct to the local master plan, and select recommendations to bring to townspeople for approval. In those towns without planning boards, this responsibility falls to the

"Don't underestimate the potential power of your plan."

Tim McKay, Natural Resources Conservation Service

selectmen. Vermont towns are also encouraged to adopt this plan to make them equal partners with their New Hampshire neighbors in conserving their shared river resource.

Adopting the local plan instead of the statewide ordinance in New Hampshire towns

Why adopt the Riverbend plan? One is custom-built, the other is general. One is the product of discussion among Riverbend citizens, and has been designed specifically for the Connecticut River and the people in this region. The other is the result of legislative action, a generalized set of rules created by state agencies for any river or lake in the state, whether it be a slow-moving, urbanized river of the Seacoast or some of the finest trout water in northern New England. The Riverbend plan's guidance for state and federal agencies also allows a town to send a clear message about its preferences to outside authorities.

Each New Hampshire riverfront town now has the opportunity to adopt appropriate recommendations of this Connecticut River Corridor Management Plan instead of the statewide Comprehensive Shoreland Protection Act (RSA 483-B, see Appendix B), which prevails on rivers not included in the Rivers Program. The law is clear that "in the event that...the cities and towns along designated rivers or segments thereof do not adopt the proposals made by their local river management advisory committees, the house and senate shall re-examine the exemption provided... and propose minimum standards..."

Therefore, New Hampshire towns along the Connecticut River have a choice that towns on other rivers do not have, but they must adopt either one or the other means of conserving the river.

"We wrote this plan for our towns, not for special interest groups."

Pete Poulsen, Littleton Co-chair, Riverbend Subcommittee

THE CONNECTICUT RIVER JOINT COMMISSIONS

The Connecticut River Joint Commissions of New Hampshire and Vermont are advisory and have no regulatory powers, preferring instead to advocate and ensure public involvement in decisions that affect the river and its valley. The CRJC's broad goal is to assure responsible economic development and economically sound environmental protection.

The thirty volunteer river commissioners, fifteen appointed by each state, are citizens who live and work in the valley and are committed to its future. The CRJC believe that the most effective action takes place when all the players come to the same table to achieve consensus. Members represent the interests of business, agriculture, forestry, conservation, hydropower, recreation, and regional planning agencies on both sides of the river. The Commissions hold a joint meeting each month, and are supported by three staff: the executive director, communications coordinator, and administrative assistant.

The New Hampshire legislature created the Connecticut River Valley Resource Commission in 1987 to preserve and protect the resources of the valley, to guide growth and development here, and to cooperate with Vermont for the benefit of the valley. The Vermont Legislature established the Connecticut River Watershed Advisory Commission in the following year. The two commissions banded together as the Connecticut River Joint Commissions (CRJC) in 1989, and also achieved the status of a non-profit organization.

CONNECTICUT RIVER JOINT COMMISSIONS

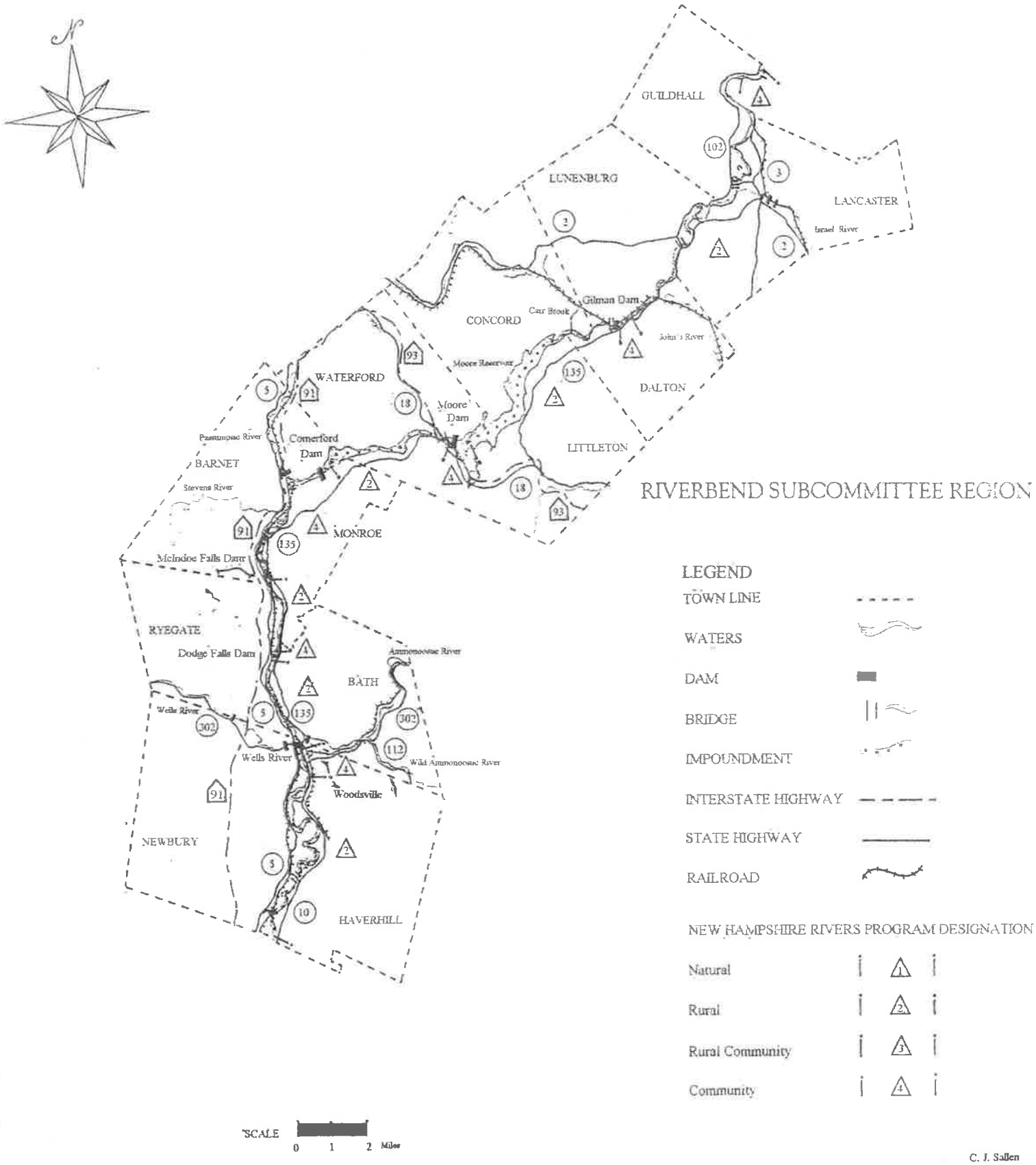
THE RIVERBEND REGION

The Connecticut River assumes many different personalities in its flow through the Riverbend Region. Meandering through fertile farmlands and among deep forests, it moves within its floodplain as it has throughout the ages, delivering soil and taking it away again. The river's dramatic drop at Fifteen Mile Falls, once a spectacular series of cascades and waterfalls that deterred even the staunch Rogers' Rangers centuries ago, has been exchanged for the magnificent expanse of Moore and Comerford reservoirs with the development of hydropower. At Moore, New Hampshire's longest river becomes its largest undeveloped lake.

The Riverbend segment's 70 mile run is the most varied of any covered by the Connecticut River Corridor Management Plan, representing a wide variety of river characteristics and uses. From Guildhall to the Simpson Paper Company Dam in Gilman, the river flows freely until just above the dam. The river's form varies from slow, strong meanders, where one can stand in a Vermont cornfield to enjoy the sunset over New Hampshire, to sprightly quick water. After a short stretch of rapids below Simpson Dam, the river enters Moore Reservoir which is almost twelve miles long. Moore Dam is used for peaking power generation, flood control, and to augment downstream flows during drier times of the year. The tailrace of Moore enters Comerford Reservoir. Comerford Dam provides power generation. Below Comerford is a brief stretch of rapids, the remainder of Fifteen Mile Falls, before entering the impoundment of McIndoes Dam, which is operated for power generation and is also used to even out the downstream impacts of flow fluctuations caused by large discharges from Comerford.

From McIndoes to Bradford the river is mostly free-flowing with some quick water and rapid segments. A dam at Dodge Falls provides power generation and impounds the river for a short distance. "The Narrows" between Woodsville and Wells River is characterized by deep holes, huge eddies, and spectacular rock formations. At Newbury, the river reaches the head of the Wilder impoundment and shows effects of the Wilder Dam 35 miles downstream, depending upon flow conditions.

On its journey the river passes fertile farmlands, ledgy uplands, rural homesteads, as well as the towns of Lancaster and Littleton and the smaller population clusters of Gilman, McIndoes Falls, Wells River, and Woodsville.



C. J. Sallen
April, 1997

WATER QUALITY

QUALITY OF THE RIVER TODAY

The quality of Connecticut River water has improved vastly since 1951, when a government report listed the many thousands of homes discharging raw sewage and the numbers of paper mills and other industries releasing untreated wastes into the river. While the quality of the Riverbend stretch had deteriorated less than in downstream reaches, it too has improved with the investment in modern septic systems and leach fields, wastewater treatment plants, manure storage facilities, and use of best management practices. Today it is not only possible but enjoyable to swim in the river, where several decades ago, one might have looked the water over carefully before plunging in. The presence of such rare species as the bald eagle and the dwarf wedge mussel is an indication of the good quality riverine habitat and water quality found in this stretch of the river.

The Upper Connecticut River region is known for its abundant ground and surface water supply. Recreational uses include fishing, boating, and swimming. Hydroelectric power generation is the prime commercial use, in addition to cooling water for a wood-fired power plant in Ryegate and for process water at paper mills in Gilman and Ryegate, Vermont.

The river flows past prime agricultural farmland and forest land, and limited residential development, and the larger towns of Lancaster, Littleton, Woodsville, and Wells River. Minor clusters of residential, commercial, and, rarely, industrial development surround smaller town centers. Riparian buffers, or filter strips of natural shoreland vegetation, remain in many locations to help hold the banks and to catch pollutants in runoff before they can reach the river.

The value of good water quality

Good water quality is an important economic as well as natural resource for the Riverbend region. The recreational opportunities offered by the Connecticut River which depend upon its water quality represent a $26-31 million dollar business in the river towns of Pittsburg to Haverhill, on the New Hampshire side alone, according to a study prepared for the Riverbend Subcommittee in 1996. Swimming, canoeing, kayaking, motor boating, fisheries directly depend upon high quality water, while the quality of life for local residents and the region's appeal to visitors depend indirectly on a clean river. Local water-dependent businesses are strongly interested in maintaining or improving water quality, with the assistance of local governments. (See Appendix C).

A look at the specifics

Water quality classifications: The river today meets New Hampshire Class B water quality standards throughout the segment. Three waste management zones have been identified by Vermont at discharges at Gilman, Ryegate, and Wells River, where waters are authorized by a permit to receive the direct discharge of wastes which, prior to treatment, contained organisms pathogenic to humans.

Water withdrawals: There are 8 major water withdrawals on this segment, including Lancaster's wastewater treatment plant, Simpson Paper Company, New England Power Company's dams at Moore, Comerford, and McIndoe Falls, the Town of Monroe's water works, and the wastewater treatment plant at Woodsville.

Wastewater discharges: There are 18 municipal and industrial waste water treatment facilities discharging directly to the mainstem. Tributaries receive discharges from four other wastewater treatment facilities within riverfront towns.

The ability of the river in the Riverbend Region to assimilate additional treated wastes depends upon the specific location of the discharge. The segment is partly a series of slow moving impoundments, with limited ability for reaeration, and already receives organic and nutrient enrichment from point and nonpoint sources, although it also receives the waters of several large tributaries which substantially increase the volume of the river as it passes through the Riverbend Region, allowing increased dilution. New Hampshire's water quality standards state that "waste assimilation and transport shall not be considered to be beneficial uses." The relatively large amounts of oxygen-demanding wastes discharged from the paper mill at Groveton result in a sag in oxygen levels in the river downstream. Discharges of additional treated wastes to the river in this segment may be possible, but it is unlikely that anti-degradation laws in New Hampshire and Vermont will allow dissolved oxygen levels to be reduced much further.

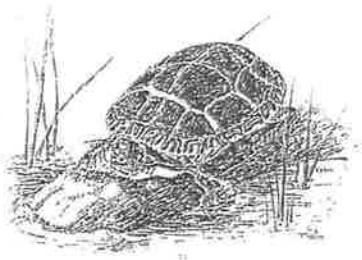
Nonpoint pollution sources: These are difficult to identify because they do not come from an easily observed point, but can include residential landscapes, farms, logging sites, failed or inadequate septic systems, and eroding riverbanks. Tributaries can also deliver such pollution to the mainstem.

Water quality monitoring stations: There are 12 government water quality monitoring stations on the mainstem of the river in this segment, and 17 more on its tributaries. The only lay monitoring stations are on Morris Brook in Haverhill.

Streamflow gauging stations: There are two stations on the mainstem, one on the Wells River, and one on the Passumpsic River.

Dams and impoundments: Five dams regulate the flow of the Connecticut River in this segment, three at the former Fifteen Mile Falls. The Simpson Paper Company dam at Gilman, operated in a run-of-the-river mode, creates a stable 2.9 mile-long impoundment. In 1955 construction of the 178' high Moore Dam, at a steep series of falls and cascades, created the 11-mile-long Moore Reservoir, changing the face of this part of the river to a vast, undeveloped lake running from Littleton and Waterford north to Dalton and Concord. Spring drawdown at this reservoir can be as much as 40 feet. Comerford Station, built in 1930, and McIndoes Station constructed the following year, are located where the river passes between Barnet and Monroe.

Comerford's reservoir, where seasonal drawdown is normally 15' (although 40' is permitted by the dam's current license), is 7 miles long. McIndoes Station creates a 5-mile-long impoundment in the river, where the water level may change by 10' seasonally. The relicensing process for the Fifteen Mile Falls developments at Comerford, McIndoes, and Moore began in 1996 and will end July 31, 2001.



As the river passes through the McIndoes Station, it immediately enters the 4-mile-long, stable impoundment behind the Dodge Falls dam at Ryegate, which is operated in run-of-the-river mode. The river below Dodge Falls is free-flowing until it reaches the Wilder impoundment at Newbury/Haverhill.

Between Guildhall and Northumberland at the northern edge of the Riverbend region is the old Wyoming Dam, now breached, where the river races over the dam's

remains. A 1993 report found that the oxygen returned to the river here is critical to the river's ability to assimilate the treated wastes discharged from the Groveton paper mill just upstream from the segment.

Conditions needed to sustain today's water quality

- water free from bacterial contamination and toxics, for safe swimming and other water contact uses
- adequate flow through impoundments and in free-flowing sections to flush pollutants and add oxygen
- control of nonpoint pollution, including nutrients from failing or inadequate septic systems and sediment
- separated treatment of sewerage and stormwater
- adequate treatment of sewage by domestic on-site systems; adequate inspection of septic systems
- wetlands near the river and throughout the towns reduce flooding and trap pollution that could enter the river
- strips of riverside vegetation, or riparian buffers, remain along much of the river and help to stabilize the banks
- addition of oxygen at rapids, breached Wyoming dam, and other free-flowing sections
- absence of toxics and heavy metals in industrial discharges and landfill leachate

Room for improvement

- fish reliably safe for human consumption
- forested buffers adjacent to waterways
- excellent water quality in Connecticut River received from its tributaries

Conditions needed to make these possible

- maintain or improve chances for oxygen to return to the river; keep the Wyoming Dam site in a breached condition to provide aeration
- acceptance of standards recently developed by American Forest and Paper Association (see Appendix I)
- adherence to best management practices for timber harvesting and agricultural practices (see Appendix D)
- use of forested riparian buffers to trap pollutants and reduce flooding

◆

CURRENT WATER QUALITY PROBLEMS

The 1994 Connecticut River Water Quality Assessment identified the following problems in the Riverbend segment: organic enrichment, sedimentation, and fluctuating flows. Three of the major tributaries entering the Riverbend segment, the Passumpsic, Ammonoosuc, and Wells Rivers, are adding nutrients to the mainstem waters. The organics and nutrients entering the river from these tributaries and from upstream point sources (three paper mills) and nonpoint sources (including farms) combined with the longer time these pollutants spend in the impoundments may be over-enriching the waters, as shown by the type of riverbottom life found in water quality studies.

Bank erosion

Bank erosion and loss of riverbottom land is a significant problem, particularly in Haverhill. Eroded sediments are accumulating in the reservoirs and to a slight extent in the six miles of free-flowing river below Dodge Falls Dam. On the New Hampshire side alone, there is bank erosion on half of the 49 miles from Moore Reservoir to Haverhill.

This process creates habitat for bank swallows and other kinds of wildlife, but it also adds sediment to the river that can smother fish spawning areas and add nutrients that can contribute to growth of algae. While bank erosion is a naturally occurring process on rivers, it can be accelerated by human activities. A 1995 inventory of erosion sites in Coos and Essex counties found 34 sites of active erosion in the 5 northernmost towns included in this segment. A similar inventory of Grafton County riverbanks was conducted in 1992.

Both studies showed that most of the moderate and severe erosion sites occurred on agricultural land, and areas with no vegetative buffer at all tended to have a higher rate of erosion, especially in combination with lack of vegetation due to livestock grazing. Steep, high banks are most prone to erosion. The most common erosive force is the river current. Concave banks, where the current is forced against the shoreline, are especially vulnerable to erosion. Fluctuations in the river level due to power production in dammed sections averaged less than one foot daily, and where shorelines are exposed and banks are undercut due to water level fluctuations, erosion occurs. Seasonal flooding was an evident erosive force. Boat wakes, ice action and freeze/thaw cycles also contribute to erosion. Various methods of erosion control have been employed, from stone riprap, tires, junk cars, and "biotechnology," and some have produced stable banks in this segment.

Other water quality concerns

- delay in addressing combined sewer overflows in St. Johnsbury wastewater treatment facility; combined sewer overflows can allow untreated sewage to be discharged into ariver during heavy storms
- enforcement of best management practices is better in NH than in VT, although there may be inadequate enforcement of violations due to limited budget ability of the Division of Resources and Economic Development to pursue repeat offenders in court
- sediment in river water creates problems at industrial water intakes
- turbidity in discharges from paper company operations
- improper manure disposal on some farms

Potential threats to water quality

- septic systems may not be checked or upgraded when a seasonal home is converted to a year-round residence, and may be inadequate for the increased sewage, releasing contaminants to groundwater which may reach surface waters
- animal waste is a source of bacteria that could be a public health concern; runoff contaminated by bacteria could cause a swimming hazard during and just after storms, as now exists in downstream reaches of the river
- warmer water temperatures in impoundments
- contamination of fish tissue by toxics or heavy metals
- siltation from improperly constructed skid roads
- inadequate buffers cannot completely capture nutrients and sediments washing off the land

- introduction of zebra mussel
- release of silt to river through use of catfish in settling ponds at Lancaster WWTF
- zinc in the Wild Ammonoosuc River could pose a problem for water supply or irrigation
- spraying of herbicides in rights -of-way along power lines near waterways may be a threat to water quality
- mercury and other heavy metals introduced into the river and its sediments over the years through discarded appliances and vehicles may enter the water column and then enter the food chain, potentially resulting in increased heavy metal content in fish tissue
- many farmers are financially forced to grow corn on riverbottom lands more continuously than is beneficial for either the soil or for water quality. Corn land is highly exposed to erosion during flooding.
- major clearcutting on steep slopes near the Connecticut River can cause erosion that sends sediment into streams, threatens fisheries, and accelerates the build up of sediment behind dams. Extensive clearcutting also changes the water retention ability of the watershed, and leads to increased runoff. These can pose a number of problems downstream, including increased flooding, riverbank erosion, and problems at industrial water intakes.

◆

OBJECTIVES

The Riverbend Subcommittee seeks abundant, healthy and clean food, water, and air, with effective water cycles leading to little flooding and few droughts, and a clean shoreline.

◆

RECOMMENDATIONS

FEDERAL GOVERNMENT

U.S. Department of Agriculture *should:*

- provide cost-sharing for conservation practices, including construction of manure storage pits to help farmers eliminate winter spreading of manure within the floodplain to protect water quality

Natural Resources Conservation Service *should:*

- encourage area farmers to participate in the Environmental Quality Incentives Program of 1996 Farm Bill

Cooperative Extension Service *should:*

- provide assistance for costs of soil testing for better nutrient management

STATE GOVERNMENT

Water quality agencies *should:*

- be funded to monitor for toxic substances in water, fish, and sediments, also monitor the health of aquatic biological communities to get a better picture of water quality
- undertake water quality sampling, including biomonitoring
- NH undertake fish tissue sampling for toxics
- enforce best/acceptable management practices
- follow up on water quality violations
- educate landowners and public on stewardship, erosion, value of forested riparian buffers

- look more closely at the effect of nutrient enrichment and water level changes on river life forms, including fish
- form partnership to purchase breached Wyoming dam site and keep it undeveloped for the water quality benefits it provides to the river
- VT assist in eliminating combined sewer overflow in St. Johnsbury
- enforce regulations respecting biosolid disposal
- encourage use of vegetative stabilization if bank stabilization is deemed appropriate on eroding banks
- support present permitting process and guidelines for gravel removal, dredge, and fill activities in RSA 483

Fish and game/wildlife agencies *should:*

- discourage increased heavy-wake boating because of its potential to increase bank erosion
- plan boating access to avoid increasing erosion on sensitive shorelines

Transportation agencies *should:*

- review their herbicide spraying program for rights of way near waterways, and consider alternatives

TOWNS *should:*

- identify extent of inadequate sewage disposal problem, especially among seasonal homes converted to year-round use; inspect sewage systems before they are completed; educate home buyers and real estate agents
- allow oxbow wetlands to develop naturally

Appendix E suggests a variety of tools for towns to use to maintain or improve the quality of their surface waters and groundwater drinking supplies.

PRIVATE SECTOR

Landowners *should:*

- follow best/acceptable management practices for timber harvesting and agriculture (see Appendix D)
- be encouraged to establish riparian buffers to: help filter out sediment and nutrients washing off the land; to allow trees and vegetation to help stabilize the banks and keep waters cooler; and to provide privacy
- minimize the aesthetic and water quality impacts of clearcutting and other timber harvesting operations, particularly near the river
- learn about stewardship, erosion, and the value of riparian buffers

Farmers *should:*

- use filter strips more consistently on agricultural lands to keep sediment and nutrients from washing into the river
- consider practicing no/low till; keep soil covered throughout the year to reduce erosion
- seek assistance from Farm Services Agency for manure holding facilities and fencing to keep livestock out of waterways
- rotate corn frequently with other crops, particularly on flood-prone land
- look into benefits of participating in the Environmental Quality Incentives Program of 1996 Farm Bill

"We are talking about what this river needs to look like, act like, and feel like to reach these objectives. We are filling the toolbox for the towns and others to follow up."

riverfront dairy farmer, Lunenburg

Railroads and utilities *should*:

- review their herbicide spraying program for rights of way near waterways, and consider alternatives; consult landowners about herbicide spraying, and provide an incentive to perform cutting as an alternative to spraying

NEP and its successors *should:*

- assess impact of hydro operations on impoundment erosion and modify operations accordingly

Citizens and local citizen groups *should:*

- continue to have a recognized role in the hydro dam relicensing process; encourage continued communication between New England Power Co. and its successors, and local communities and landowners

◆

REFERENCES

Connecticut River Water Quality Assessment, NH Dept. of Environmental Services and VT Dept. of Environmental Conservation, 1994. Prepared for the CRJC with support from EPA, this bi-state assessment of the watershed is written for a non-technical audience and describes general and specific water quality issues on the Connecticut River mainstem and its tributaries. It answers seven questions regarding water quality for each subcommittee region: is river water drinkable? Can the fish be eaten? Are the existing dams contributing to a water quality problem? Is the river healthy from an aquatic life point of view? Can I safely swim in the Connecticut River? Can I use the water for water supply, irrigation, and other purposes? Can I discharge additional wastes to the river? It also answers the question of whether NH and VT contribute to the nutrient pollution of Long Island Sound. The report includes an extensive technical appendix and presents the states' strategies for correcting water pollution in the basin.

Along the Northern Connecticut River: An Inventory of Significant Instream Features, Connecticut River Joint Commissions, 1994. This inventory contains the available information relating to in-stream features of the Connecticut River mainstem for both sides of the river. It covers water quality features, such as location of water quality and streamflow gauging stations water withdrawals, and wastewater treatment facilities; river flow and riverbank features, such as dams, impoundments, and significant streambank erosion sites; and recreational features, such as whitewater segments, boat launch sites and campgrounds. Information is presented by local river subcommittee region both in tables and on GIS-based maps. An extensive annotated bibliography covers both technical publications and those focusing on Connecticut River history and travel. The inventory is also provided on a computer disk in the front of the notebook for easy reference. Designed to be user-friendly, it can be run on a personal computer using MS-DOS. The appendix includes instructions on how to operate the disk.

LIVING WITH THE RIVER SERIES of publications by the Connecticut River Joint Commissions:
A Homeowner's Guide to Nonpoint Source Water Pollution in the Connecticut River Valley, 1994. This booklet offers useful hints for homeowners on managing runoff, caring for septic systems, conserving water, and dealing with yard waste, bugs, and chemicals. It also offers alternatives for toxic household products and a directory of sources of help.

The Watershed Guide to Cleaner Rivers, Lakes, and Streams, Brian Kent, 1995. Liberally illustrated, this guide describes the causes of nonpoint pollution, suggests ways to reduce and prevent it from reaching waterways, and provides basic ideas that citizens can use to help improve water quality in the valley. The report covers a number of best management practices for construction sites, developed areas, backyards, septic systems, gravel and sandpits, marinas, farms, golf courses, woodlots, and storage of hazardous materials, and includes a useful directory.

A Citizen's Guide to River Monitoring in the Connecticut River Valley, Geoff Dates, River Watch Network, 1995. This user-friendly guide is intended to help people establish long-term, community-based, and scientifically credible river monitoring programs in the valley.

The Challenge of Erosion in the Connecticut River Watershed, 1996. A series of informational fact sheets on riverbanks and buffers summarize the findings of a year-long multi-agency investigation into riverbank erosion. Written for the riverfront

landowner or interested citizen, they cover river dynamics and the many causes of erosion, riparian buffers, streambank stabilization techniques, field assessment of problem sites, and a guide to permitting requirements on each side of the river.

◆

Best Management Practices to Control Nonpoint Source Pollution: A Guide for Citizens and Town Officials, NH Dept. of Environmental Services, 1994. This useful reference explains nonpoint source pollution and concisely covers the best management practices, current laws and regulations, and reasons for concern for the top ten land use activities which can cause pollution. Individual actions are highlighted, as well as current watershed protection and planning.

Connecticut River Erosion Inventory of Coos County NH and Essex County VT, Coos Co. Conservation District and Essex County Natural Resources Conservation District, 1995. This is a report on a field assessment of all erosion sites on the river in these two counties using the criteria developed by the 1992 Grafton County inventory. Field data sheets, color photographs, and topographic maps marking the erosion sites, which are color coded for severity, are available at the Coos Co. Conservation District office in Lancaster and at the CRJC office in Charlestown. A summary report is also available for public information.

Connecticut River Erosion Inventory, Grafton County Conservation District in cooperation with the Soil Conservation Service, 1992. This study inventoried and classified erosion sites on the 89 miles of the river in Grafton County, NH. The three volumes include photographs and location and adjacent land use assessments. Living with the River: a Landowner's Guide to Erosion Control on the Connecticut River is a public information pamphlet based on the results of the survey.

Native Vegetation for Lakeshores, Streamsides, and Wetland Buffers, VT Dept. of Environmental Conservation, 1994. This guide describes buffer strips and contains general considerations, native plant descriptions and maps of hardiness zones in VT for buffer strip enhancement.

New Hampshire Resource Protection Project, New England Interstate Pollution Control Commission and Environmental Protection Agency, 1995. This project is a cooperative endeavor among federal, state and local government agencies along with private conservation and business interests. Its goal is to identify high priority natural resource areas in NH and assist in those regions' protection planning efforts. Using GIS technology, the study analyzed data on wildlife habitat, drinking water supplies, forestry, agriculture, recreation, and pollution threats. Six areas in NH were targeted for attention based on the value of their natural resources, including the Connecticut Lakes.

Maps

(NOTE: GIS = Geographic Information Systems, indicates computerized database as source of map)

GIS maps produced for the CRJC and the local subcommittees by MicroDATA, with the support of VT Agency of Natural Resources, 1994. Also presented in Along the Northern Connecticut River: An Inventory of Significant Instream Features at a scale of 1:63,360.

- Riverbend Region- Water Quality. Map displays NH Rivers Program segment designations, VT wastewater management zones, water quality sampling stations, gauge stations, point discharges, water withdrawals, hydro electric water use, municipal water supplies, surface waters, roads, and railroad routes for the towns of Lancaster/Guildhall through Newbury/Haverhill, scale 1:31,680
- Riverbend Region- River Flow and Shorelines. Map displays dam sites, impoundment zones, and shoreline erosion distinguished as severe or moderate/unclassified, surface waters, roads, and railroad routes for the towns of Lancaster/Guildhall through Newbury/Haverhill, scale 1:31,680

Highlights of the New Hampshire Natural Resource Protection Project, New England Interstate Water Pollution Control Commission and the Environmental Protection Agency, 1996. GIS maps prepared for each of the five CRJC local river subcommittees show agricultural lands, unfragmented natural lands and shorelines, high value freshwater wetlands, drinking water supplies and pollution threats, bald eagle wintering sites, conservation and public lands, and some natural heritage inventory sites. Scale varies.

Connecticut River Basin Sampling Stations, NH Dept. of Environmental Services, 1994. Series of three GIS maps covering the entire watershed in NH and VT shows surface waters, sub-watershed boundaries, NPDES outfalls, and water quality sampling stations for the Connecticut River Watch Program, and NH DES , and the VT Dept. of Environmental Conservation. Scale 1:150,000.

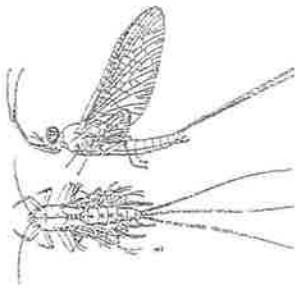
FISHERIES & AQUATIC HABITAT

LIFE ON AND IN THE RIVER

The fishery in the Riverbend Region is a mixture of cold and warm water species, with a concentration of coldwater species at the northern end. The heaviest fishing pressure in the Riverbend segment occurs from Moore Reservoir to McIndoes Reservoir. The stretch above Simpson Paper Company Dam and below McIndoes Dam is underutilized, mostly due to inaccessibility of the river, therefore less is known about the fisheries of this area. The fishing is considered excellent in Moore Reservoir and tailrace, Comerford Reservoir and tailrace, and the stretch of river between Comerford and McIndoes Dams. Moore's tailrace is known for its large trout, and the New Hampshire Fish and Game Department, at the urging of Trout Unlimited, has placed a one-bag limit on these fish in hopes of maintaining a trophy fishery. New Hampshire Fish and Game considers that this fishery is not quite as good as it once was due to the fishing pressure and decreased productivity.[1]

Data from an annual fishing tournament held each June on Moore Reservoir show good catches of rainbow trout, brown trout, pickerel, yellow perch, smallmouth bass, and other species of fish. Organized bass clubs have also held tournaments on the reservoir in recent years. A northern pike was registered at a recent tournament and this was the first documentation of this species' existence in Moore Reservoir. It is believed that northern pike were illegally introduced into the reservoir. Principal game species in Moore's tailrace are rainbow and brown trout and smallmouth bass.

In Comerford and McIndoes Reservoirs and tailraces the principal game species are rainbow and brown trout, pickerel, smallmouth bass, and a few largemouth bass. Comerford Reservoir has been stocked with surplus rainbow and brown trout on occasion by both New Hampshire and Vermont. There are also walleye in the river below McIndoes Dam. Walleye are a particularly important species below Dodge Falls.



Aquatic habitat quality

Water quality for the Riverbend segment of the river has been designated as generally good and improving. In Moore Reservoir the dissolved oxygen level was tested and found favorable for current fish species right down to the bottom. A recent survey done by New Hampshire Department of Environmental Services for Moore Reservoir changed the water classification from "eutrophic" (reduced dissolved oxygen) to "oligotrophic" (having abundant dissolved oxygen and good clarity). This is the highest standard for lakes, ponds, and impoundments.

The river naturally carries a significant amount of woody debris, particularly during high water flows, which lodges on the river bottom and along the banks, providing fish and macroinvertebrate habitat.

---

[1] *In addition to members of the Riverbend Subcommittee, the following fisheries experts were interviewed and their comments cited: Scott Decker, Tod Bogardus - State of New Hampshire, Eric Palmer, Len Gerardi, Mike Kline, - State of Vermont, and Gary Moore- former Vermont Fish and Wildlife Commissioner and NEP consultant.*

Fish passage

The Dodge Falls Dam, located some 270 miles from the river's mouth, is presently the limit of upstream migration on the Connecticut River for anadromous fish such as Atlantic salmon. There is presently no upstream fish passage provided at any of the five dams in this segment, although downstream passage is provided at the dams at McIndoes Falls and Dodge Falls.

Potential fishery improvements

Moore and Comerford Reservoirs could be premiere multiple species fisheries with proper management (according to Scott Decker, New Hampshire). These reservoirs already hold both cold and warm water fish. Comerford's tailrace has good potential for being an excellent tailrace fishery. Trout Unlimited has reported that they fish the tailrace regularly and have had good success.

"We need some compromise on water level fluctuations. We're creating a seasonal event five days a week."

Waterford landowner

◆

CURRENT PROBLEMS

There is a need for greater cooperation between Vermont and New Hampshire on the part of both biologists and enforcement officials. Vermonters share equally in utilization of the resource, but New Hampshire carries most of the burden of maintenance. "There is little to no formal communication with New Hampshire counterparts. No official mechanism for such communication exists, although they try to keep their contacts aware of their work."(Gerardi,Palmer/VT, Decker, Bogardus/NH).

Conflicts arise over substantial portions of the river resulting from its multiple uses. Power generation causes fluctuations in impoundment levels which can limit fish habitat. "Water level stabilization is exceedingly important. This is because the area close to shore is the area that provides the plants, the invertebrates, the environment for little fish which in turn provides the feeding/breeding ground for bigger fish. Covering and uncovering that area decimates the fishery environment." (Kline /VT). Gerardi and Palmer add that the most important areas for fisheries management are the littoral and sublittoral zones, that area from the high water mark to the depth of about twenty feet. The trauma to this region by wide and quick swings in the water level is severe.

Bank erosion

Bank erosion is perhaps the most important problem for the fisheries according to Kline. The crevices between the stones on the river bottom are the best environment for the invertebrates so important to the food chain. Bank erosion caused by boats, water skiers, and level fluctuations causes sedimentation that fills the crevices, killing off the invertebrate population and interrupting the food chain. Kline adds that "agriculture and urban run-off adds undesired levels of nutrients to the river, resulting in eutrophication, (water becoming murky from algae and silt, and low in oxygen), as well as unmanageable and undesirable plant growth. When these plants die, they sink to the bottom and oxygen is used as they decompose. Finally he points out that temperature stress, (temperatures rising to 75 F.) can kill trout. Woody vegetation buffers along the banks are most useful in keeping the water cool.

"Woody vegetation buffers along the banks are most useful in keeping the water cool for trout."

Mike Kline VT Agency of Natural Resources

Problem areas in specific segments

◆ Guildhall-Gilman. Excellent trout, bass and pickerel habitat, underutilized due to poor access (Decker), but many feel increased use by power boats would damage the fishery (see Kline above). G. Moore suggests better access but with 10 horsepower limit.

◆ Moore Reservoir. Problem areas as outlined above. Most agree the fishing in Moore is excellent. Decker says there is a need to stabilize fluctuations. Decker and Bogardus say the annual bass tournaments put the greatest fishing pressure on Moore Reservoir, and many fishermen complain of low catches after tournaments.

◆ Many fishermen complain of parasites in the fish of both Moore and Comerford, particularly in late summer. Kline says this is due to stress to the fish population caused by swings in water level, water temperature, and water velocity.

◆Comerford Reservoir. Similar to Moore. Decker says little is known about it as a fishery, and that the Moore tailrace (part of Comerford) is said to have declined as a well known fishing spot, reputedly because there is less sewage to fertilize the waters.

◆ Comerford tailrace to McIndoes. Better access would be useful here, including foot and canoe access at the tailrace, and boat access with a 10 horsepower limit by the North Monroe bridge. Many fishermen complain about level changes in McIndoes, but some fishermen like it and utilize the level changes to their advantage. This area is shallow and not heavily used.

◆ McIndoes tailrace to Newbury. Improved fishing access is needed above Dodge Falls. Decker, Moore and others would like to see walleye stocking attempted again above its natural range, which now ends at Dodge Falls.

Potential Problems

Nearly all those interviewed expressed concern about over-use of the fishery both now and in the future. Bass tournaments cited here as a present problem could be a bigger problem in the future if not accompanied by better management and bi-state cooperation. High powered boats, if allowed with improved access, can add to bank erosion and sedimentation, which will damage the fishery (see Kline).

Subcommittee members are also concerned about public health and the potential contamination of fish tissue from heavy metals such as mercury, and whether parasites affect fish in the river.

Addition of woody and other debris to the river in an attempt to provide additional fish habitat is unnecessary and may contribute to boating hazards and to debris and maintenance problems at the screens behind the dams.

Atlantic salmon restoration

For many years, federal and state officials, scientists, and fishery biologists have been working on restoration of the Atlantic salmon to the Connecticut River. This effort is coordinated by the Connecticut River Atlantic Salmon Commission, which has a legal mandate to restore migratory fish. Discussion about fish passage at dams begins when warranted by the number of upstream returning fish.

The Riverbend Subcommittee sees anadromous salmon restoration in the Riverbend area as impractical and ill-conceived at this time. Such an effort might detract from more effective and practical efforts at fishery improvement such as walleye stocking and habitat improvement. A requirement for anadromous fish passage at Fifteen Mile Falls could have a negative effect on both the existing fisheries and the economy by absorbing funds which could have been better spent on habitat improvements which could benefit many more species.

OBJECTIVES

The Riverbend Subcommittee hopes that the Connecticut River could become a premiere multiple species fishery. In order for that to happen, additional stocking of such fish as walleyed pike, landlocked salmon, and lake trout is desirable if there is no coexistence problem with current resident species. Concurrently, we should work towards returning the river to a condition where restocking programs are no longer needed because the fish will naturally thrive and restock themselves.

◆

RECOMMENDATIONS

STATE GOVERNMENT

Water quality agencies *should:*

- use data generated by relicensing of Fifteen Mile Falls to set more stringent quality standards where achievable
- provide riverbank stabilization where appropriate, including vegetation in the design to provide shading and pollution filtration

Fish and game/wildlife agencies *should:*

- expand fish stocking to include walleyed pike, landlocked salmon, and lake trout provided they can coexist with existing species
- gather data on the impact of water level fluctuations on the fisheries through the relicensing of Fifteen Mile Falls. Obtain realistic constraints on minimum and maximum water levels in each impoundment, particularly with regard to the timing of fish spawning. Water level fluctuation could be the single most important fishery management issue because it adversely impacts the littoral and sublittoral zones which support the aquatic food chain.
- develop and continually evaluate three year plans for their activities, and formally communicate them to their counterparts across the river. Ensure communication and coordination between New Hampshire and Vermont in their fish stocking programs.
- discourage construction of more access sites for high-speed, high-powered boats particularly near sensitive banks
- examine fish tissue for contamination by heavy metals and parasitism

Department of Safety *should:*

- enforce existing laws on boats and water skiers with respect to speeds and distances from shore, and find ways to educate the public about these laws
- limit use of high speed, high powered boats and water skiing to limited and preselected areas on Moore and Comerford Reservoirs. Riverbend Subcommittee members agree that boat wakes aggravate bank erosion, and that an effective means of protecting aquatic habitat and fisheries in the region would be to minimize the impacts of boat wakes on the riverbank through enforcement of existing boat speed laws

Transportation agencies *should:*

- review all new roadways, lanes, and bicycle paths to ensure there is a buffer of vegetation to help shade the water to keep it cool, and to filter out pollutants and sediment that might otherwise enter the water

Connecticut River Joint Commissions *should:*

- ensure participation by local communities and citizens in the relicensing of Fifteen Mile Falls

TOWNS *should*:

- consider establishing buffer zones where roads, parking areas, or other construction are prohibited, to allow trees and vegetation to provide cooling to the river
- discourage construction of any new boat ramps on the river, in order to minimize bank erosion

PRIVATE SECTOR

New England Power Company and its successors *should:*

- make available studies of fisheries prepared during relicensing of Fifteen Mile Falls

◆

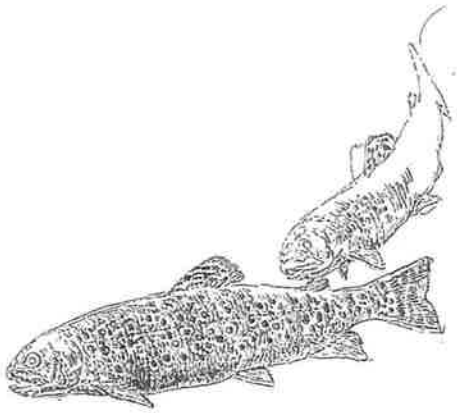
REFERENCES

Connecticut River Water Quality Assessment, New Hampshire Department of Environmental Services and Vermont Department of Environmental Conservation, 1994.

Initial Consultation Document, Fifteen Mile Falls Project L.P. #2077, New England Power Company, 1996. Prepared by the company as part of the procedure of relicensing this hydroelectric project, Volume I contains a description of the sites, operations, and environmental and social setting of the three dams at NEP's Fifteen Mile Falls development. Volume II contains a series of maps relating to the project.

MAP

Atlantic Salmon in the Connecticut River Watershed. Map shows the anticipated future fishery, current and future stocking and resting areas, and current and future migratory pathways for salmon in the four-state watershed. Produced for the CRJC and local river subcommittees in 1994 by the U.S. Fish and Wildlife Service Connecticut River Coordinator's Office.



SHORELAND & UPLAND HABITAT

LIFE ALONG THE CONNECTICUT RIVER

More than just a human home, the Connecticut River and its corridor harbor many different kinds of plants and animals. A rich variety of habitat types is concentrated close to the river, from the ledgy uplands of spruce-fir and northern hardwood forest to the fertile floodplain and remnants of its riverbottom silver maple stands, to setbacks and oxbows and the largely undeveloped shorelines of Moore and Comerford reservoirs. Wetlands offer highly productive habitat for wildlife, and also filter pollutants and reduce the effects of flooding.

Some species, such as the beaver, Canada goose, and the cattail, are common and are familiar to all. They may occur along the river, but are also found in a variety of different types of habitats. Strong populations of bear, deer, moose, otter, mink, fisher, and beaver currently exist in the region. Moose are increasingly abundant. Other species have narrower ranges, and are primarily found in the special sorts of conditions that the river and its corridor provide.

Hunting and trapping are important forms of recreation in the Riverbend Region for both residents and visitors, and contribute heavily to the seasonal economy. Wildlife are also taken for sustenance. Many people also enjoy observing and photographing wildlife.

Migration corridor

The river functions as a migration corridor for waterfowl, smaller birds which winter in the tropics, and other species which take advantage of the slightly milder conditions near the river before passing into upland habitat as spring proceeds. During spring and fall migration, hundreds of waterfowl congregate on Moore and Comerford reservoirs and on the river downstream, and include scaup, black duck, ring-necked duck, mallard, common golden-eye, bufflehead, scoters, mergansers, and loons. Waterfowl, especially common mergansers, also winter in open water areas. Many of the insect-eating birds which use the river as a corridor prey upon forest insects such as the spruce budworm. Conserving their habitat may well contribute to the health of forests in this region and beyond.

Rare species

A number of species whose populations have been sharply reduced still frequent the Connecticut River in the Riverbend region, including the bald eagle (state status: endangered; federal status: threatened), which is seen more regularly in the area of Fifteen Mile Falls than anywhere else on the Connecticut River. The Audubon Society of New Hampshire has monitored eagles there since 1983, and has found that birds are now regularly resident on the impoundments during the summer, preferring islands and promontories. In winter, eagles fish in ice-free waters around Moore Dam. While there is as yet no evidence of nesting, excellent potential habitat for nesting is available around Moore Reservoir. Osprey (threatened in NH) have also been observed at Gilman Dam. The northern harrier (marsh hawk; threatened in NH) nests in open grasslands in Bath. A peregrine falcon fledging at Stark in 1996 was observed in Newbury during migration, having followed the Ammonoosuc to the Connecticut River on its way south. The dwarf

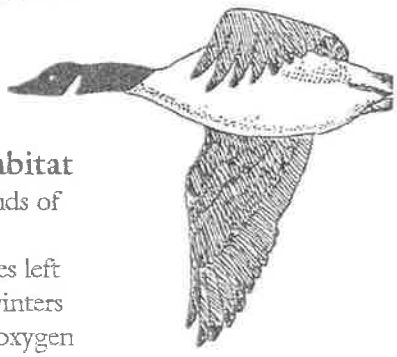
wedge mussel (state and federal status: endangered) has recently been discovered on the riverbottom in Lancaster. Wild turkeys are moving north to this area and have been observed using riverfront agricultural lands. Bluebirds also nest in open fields. Scores of rare plant species also find appropriate habitat near the river, including at Bedell Bridge State Park.

Habitat diversity and quality

The diversity of wildlife is directly related to the health and diversity of available habitat. Here in the Riverbend region, habitat in the river corridor is much less fragmented than it is in more developed areas downstream, allowing wildlife to move more freely and find more cover, most particularly in the thousands of acres surrounding Moore Reservoir.

Ecologically significant community types include: floodplain forests, rivershore grassland, riverside outcrop community, lowland bogs, seepage swamps and forests that may be either acidic or calcareous and support different plants and animals depending upon their acidity. Oxbows, wetlands, and the confluences of tributaries are especially important for fish and wildlife. The Nature Conservancy holds an easement on one of the Nine Islands, where a remarkable example of undisturbed climax floodplain forest remains.

Riverfront farms are particularly significant resources for some species of wildlife. They support wild turkeys in winter and migrating geese largely from New Brunswick and Nova Scotia, among others.



Conditions needed to sustain habitat

- riverfront farms and the open space they provide are important for certain kinds of wildlife, most notably game birds, because of the mixed habitat of open fields, fencerows, and wooded land; turkeys forage during the winter on crop residues left in fields, and may depend upon this source of food during particularly harsh winters
- unimpounded river where it now exists; passage over riffles and cascades mixes oxygen into the water
- high water quality for otter, mink, fish, and other aquatic wildlife
- good forestry and agricultural practices that minimize erosion and sedimentation
- forest management practices that follow American Forest & Paper Association guidelines (see Appendix E)
- large tracts of unbroken land for bear habitat
- spruce/fir, cedar, or hemlock groves for deer wintering yards
- corridors for travel between pockets of suitable habitat
- adequate buffers of native vegetation between upland areas and wetlands, streams, and the river to protect these habitats from sedimentation and other effects of development. This transition zone between the river and nearby uplands provides food, cover, and travel routes, roosting sites, nesting sites, and denning sites, and is also a refuge to wildlife species during high water events.
- river and oxbow habitat are relatively free from disturbance by power boats
- good stewardship of land and water resources by New England Power Company, its successors, and other landowners
- wetlands provide highly productive wildlife habitat, flood control, open space, natural filter for sediment and other water pollutants, and recreation

Opportunities for the future

- habitat conservation
- scientific research
- "ecotourism," educational field trips, low impact recreation
- plantings of millet, corn, and fruiting shrubs near the river can provide valuable turkey and deer forage. Allowing some standing corn to remain in the fields offers a significant boost to foraging wildlife, especially turkeys. Farmers could use assistance to plant forage crops on land they no longer use, allowing them to justify keeping this land and keeping it open.
- good communication between landowners and Fish and Game/Wildlife agencies and Natural Resources Conservation Service will allow landowners to take advantage of cost-sharing and incentive programs

"If we want to keep habitat along the river, we have to maintain the economic viability of riverfront farms."

riverfront landowner, Guildhall

◆

CURRENT PROBLEMS

- decline of dairy farms and reduction of the wildlife habitat they provide
- variable water levels may temporarily or permanently eliminate instream and shoreline habitat
- draining of setbacks reduces habitat
- areas of suitable habitat are becoming fragmented, preventing dispersal of wildlife
- introduction of exotics such as purple loosestrife and giant reed, which displace native plants offering better food or cover for wildlife
- disturbance of loons by boaters
- danger to waterfowl who become entangled in monofilament or other debris left by recreationists; lead poisoning of loons and other waterfowl who ingest lead sinkers
- data used by Natural Heritage Inventory programs may not be entirely reliable

Potential problems

- loss of significant areas of relatively unfragmented habitat should New England Power Company sell some of its thousands of acres in the region, particularly around Moore Reservoir
- alteration of forest cover, especially of deer yards, and mast-producing plant species, by imported conditions such as acid rain, hemlock woolly adelgid, and gypsy moth
- loss of deer yards through failure to follow best management practices in timber harvesting
- introduction of zebra mussel

"Let's be sure that decisions are based on good science, and not upon old data or hearsay."

Lancaster businessman

◆

OBJECTIVES

Most of the property along the river is owned by individual landowners who have in the past and will continue in the future to play a key role in habitat conservation. The Subcommittee values the diversity of wildlife and habitat associated with the Connecticut River and its rich bottom lands. We seek to maintain this diversity in the Riverbend Region and to balance multiple uses of the region with wildlife requirements. The approach should be oriented toward conservation rather than strict preservation. Particularly since the entire impact of the loss of a species cannot be completely understood, it is both our opportunity and our responsibility to provide for the future of these rarer plants and animals, for we can play a major role in their survival.

FEDERAL GOVERNMENT

Natural Resources Conservation Service *should*:

- assist landowners to take advantage of the 1996 Farm Bill's Environmental Quality Incentives Program

U. S. Fish and Wildlife Service *should:*

- examine the present distribution and extent of Connecticut River populations of dwarf wedge mussel to determine if it still warrants inclusion on the endangered species list

Cooperative Extension Service's SeaGrant program *should:*

- provide education for visitors, boat owners and waterfront property owners about zebra mussel

STATE GOVERNMENT

Legislatures *should:*

- retain current use program in New Hampshire and strengthen it in Vermont

Fish and game/wildlife agencies *should:*

- examine the impact of water flow regime upon habitat
- work with farmers toward integrating seasonal and year-round farm activity with wildlife habitat needs; look at both where and when farm work is done to minimize conflict with wildlife when possible
- provide financial incentives to landowners for measures taken to enhance habitat on their land
- provide information to landowners about how to conserve habitat on their land
- provide education on significant habitat and good stewardship for local conservation and planning commissions, outfitters, citizens
- lease or purchase development rights on privately-owned riverfront farms or other areas of important habitat ***if the farmer/landowner is interested***
- work with New England Power Company and its successors to install osprey nesting platforms at appropriate locations on Moore and Comerford reservoirs; assist NEP and its successors to manage their extensive riverfront lands appropriately for wildlife
- discourage fishermen from using lead sinkers and discarding monofilament and other debris

Water quality agencies *should:*

- avoid construction of additional dams and further impoundment of the river
- encourage vegetative bank stabilization along the river; minimize the use of riprap
- discourage impacts upon wetlands
- discourage gravel mining in the river

Tourism offices *should:*

- develop information for visitors on low impact visitor etiquette, including proper driving habits and parking procedures for moose watching to avoid endangering the native population of humans
- assist local businesses in developing tourism oriented around the region's wildlife

Natural Heritage Inventory programs *should:*

- be sure that management decisions are based on good science and not upon old data or hearsay

TOWNS *should:*

- encourage cooperation and local partnerships among private landowners and non-profit organizations which can provide assistance in preserving/maintaining natural communities
- support the maintenance of natural features along the river
- encourage road agents to use vegetative bank stabilization where appropriate and minimize use of riprap and other "hard" solutions where bank erosion is a problem
- discourage impact to wetlands along the river
- learn about plants, animals, and habitats of concern within the town
- develop management plans for town-owned conservation areas

PRIVATE SECTOR

Landowners (including the railroad, New England Power Co.) *should:*

- follow current laws
- support the maintenance of natural features along the river
- maintain vegetated riverside buffers which stabilize the riverbanks; the buffer should be sufficient to permit wildlife to avoid using its edge, where they may be more vulnerable to predators such as raccoons and domestic cats and dogs
- avoid impacts to wetlands
- contact the NRCS about the 1996 Farm Bill's Environmental Quality Incentives Program
- learn to recognize species of concern
- avoid planting purple loosestrife in gardens and introducing other exotics
- consider presence of deer yards and den trees when planning and conducting logging operations
- leave buffers along streams for insect-eating birds to help control forest insect outbreaks

Business community *should:*

- develop tourism based on enjoyment of the natural resources of the area; prepare and distribute information on lodging, attractions
- assist with appropriate literature for visitors interested in natural history
- New England Power Company and its successors should continue to be aware of their key stewardship role and cooperate with natural resource agencies and organizations for good wildlife and habitat management

Non-governmental organizations *should:*

- examine impact of water flow regime upon habitat, and participate in hydro relicensing
- provide educational programs for residents and visitors about local wildlife and habitat
- participate in partnerships with natural resource agencies and interested landowners

◆

EXISTING PROGRAMS TO BENEFIT HABITAT

- 1996 Farm Bill's Environmental Quality Incentives Program
- The state Natural Heritage Inventory Programs
- Partners for Wildlife Program (state cost-sharing grant program for habitat conservation, such as funding to assist farmers in planting forage crops)
- Silvio Conte National Fish and Wildlife Refuge (grant program and other means of habitat conservation)
- Connecticut River Joint Commissions' Partnership Program (grant program for river stewardship projects)
- relicensing procedure for Fifteen Mile Falls hydro dams, which will involve review of any comprehensive management plan already in place for the affected reach of the river and involve public participation
- Connecticut River Watershed Council
- conservation easements and other land protection options through the Upper Valley Land Trust, Passumpsic Land Trust, and other local land trusts, The Nature Conservancy, Society for Protection of New Hampshire Forests, Audubon Society of New Hampshire; VT Audubon Society chapters, New EnglandWildflower Society
- SeaGrant Program, which works to prevent introduction of zebra mussel

REFERENCES

Silvio Conte National Fish and Wildlife Refuge Final Action Plan and Environmental Impact Statement, US Fish and Wildlife Service, 1995. This extensive report details the findings of the Service in addressing Congress's direction to establish a wildlife refuge in the Connecticut River Valley, and describes the environmental and economic consequences of five alternative plans of action. In addition to description of the plant, fish, and wildlife resources of the watershed, the report identifies sources of funding assistance, technical support, public concerns and comments, and various management options for land, water, and public education. The report also describes "special focus areas" identified by the Service.

Finding Common Ground: Conserving the Northern Forest, Northern Forest Lands Council, Concord, NH, 1994. This report presents the findings and recommendations of the collaborative effort to reinforce the traditional patterns of land ownership and uses of large forest areas in the Northern Forest of New Hampshire, Vermont, New York, and Maine.

MAPS

GIS maps produced for the CRJC and local river subcommittees in 1994 by the U.S. Fish and Wildlife Service Connecticut River Coordinator's Office:

*Communities. Map showing the general location of unidentified biological communities of concern and their rarity within the watershed, in all the watershed towns in the Riverbend Region. Accompanied by descriptive listing of these communities and their rarity rank on a state, watershed, and global scale, location unidentified. Scale 1:100,000

*Plants. Map showing the general location of unidentified plant species of concern and their rarity within the watershed, in all the watershed towns in the Riverbend Region. Accompanied by descriptive listing of these species and their rarity rank on a state, watershed, and global scale, location unidentified. Scale 1:100,000

*Wildlife. Map showing the general location of unidentified wildlife species of concern and their rarity within the watershed, in all the watershed towns in the Riverbend Region. Accompanied by descriptive listing of these species and their rarity rank on a state, watershed, and global scale, location unidentified. Scale 1:100,000

*Bald Eagles in the Connecticut River Watershed. Shows bald eagle use areas in the four-state watershed.

*Waterfowl in the Connecticut River Watershed. Map shows waterfowl use in the four-state watershed.

Highlights of the New Hampshire Natural Resource Protection Project, New England Interstate Water Pollution Control Commission and the Environmental Protection Agency, 1996. GIS map prepared for each of the five CRJC local river subcommittees shows agricultural lands, unfragmented natural lands and shorelines, high value freshwater wetlands, drinking water supplies and pollution threats, bald eagle wintering sites, conservation and public lands, and some natural heritage inventory sites.

RECREATION

ON AND ALONG THE CONNECTICUT RIVER

The Riverbend Region offers more recreational opportunities than perhaps any other segment of the Connecticut River, due in part to the varied character of the river, the appealing quality of its water, and the scenic nature of the largely undeveloped lands along its banks. Canoeing, kayaking, rafting, sailing, swimming, and fishing are important low-impact forms of river recreation, while power boating, water skiing, boating regattas, and jet skiing are common higher-impact activities. The river is used here year-round with ice-fishing a popular winter activity on Moore Reservoir.

Popular land-based recreational opportunities include camping, hiking, bicycling, hunting, picnicking, photography, bird-and wildlife-watching, and cross-country skiing, as well as snowmobiling and touring by all-terrain vehicles. The open scenic views of the river valley provide pleasurable automobile touring, particularly along Routes 10 and 135 in New Hampshire, and Route 5 in Vermont. The visitor center at Moore Reservoir is a popular tourist stop off Interstate 93. Snowmobilers currently use New England Power Company's power line corridors for travel in the region of Moore Reservoir.

Recreational use of the river and its corridor in the towns

Guildhall, VT: Individual bicyclists and bike tours use Route 102. This route is also a popular scenic drive.

Lancaster, NH: Individual bicyclists and bike tours follow Route 135 south of town, which is also a well-used scenic drive.

Dalton, NH: Individual bicyclists and bike tours use Route 135 in Dalton, which is also a popular route for automobile touring.

Waterford, VT: Picnicking on New England Power Company land near Moore Reservoir.

Littleton, NH: Swimming at Moore Dam and waterskiing and cruising on Moore Reservoir. Individual bicyclists and bike tours use Route 135 in Littleton, a popular scenic drive. Picnicking and boating from NEP launches on Moore and Comerford Reservoirs.

Monroe, NH: Picnicking at McIndoes Falls Dam. Individual bicyclists and bike tours use Route 135, a popular scenic drive. Swimming and picnicking at the impoundment above the Comerford Dam.

Bath, NH: Individual bicyclists and bike tours use scenic Route 135 in Bath. Saddle Island is owned by the Connecticut River Watershed Council and is used for camping. Primitive canoe campsite established by the Upper Valley Land Trust at the portage trail at Dodge Falls Dam.

Haverhill, NH: Swimming at Bedell Bridge State Park. At Woodsville and downstream, people picnic on and swim from sandbars on the river. Some also camp on the sandbars. Individual bicyclists and bike tours use Route 135 down into Woodsville and head south out of town on Route 10. One bike tour stops at the Haverhill Corner bandstand for lunch. These routes are also popular scenic drives. Trail on Black Mountain offers good views of the river valley. Primitive canoe campsite created by the Upper Valley Land Trust at Horse Meadow.

Newbury, VT: Trail on Mount Pulaski offers good views of the village and river valley. Primitive canoe campsite at Vaughan Meadow, created by the Upper Valley Land Trust.
Barnet, VT: Popular picnic and swim areas above Comerford Dam. Primitive canoe campsite trail begins on the Passumpsic River in Barnet; bicyclists use a loop to Waterford. A new canoe launch will be installed on the Passumpsic River in 1997 with funding from the CRJC Partnership Program and other sources. Two hundred feet of cascades in Barnet are a local recreation attraction on the river.

Boating

Boating usage varies depending on the character of the river as it varies from swift and free-flowing to impounded behind Gilman Dam and the three dams of New England Power Company's Fifteen Mile Falls development. Some kayakers play in the drop that exists at the breached Northumberland dam. From Guildhall to the Gilman Dam the river moves quickly and is frequently shallow, making it most suitable for canoes and kayaks, although use is light due to the limited access in this area. Weekday use is often by camp groups, while weekend use is more often by individuals. The section above the Gilman Dam in Dalton is used by pontoon boats moored in the river.

An aerial reconnaissance of river recreational use during the summer of 1996 showed that the stretch from Guildhall-Northumberland to Gilman-Dalton is under-used for boating and fishing, in strong contrast to the river north of this segment. The twenty-one river miles are slow moving, with fewer of the oxbows and beaches that attract campers, but the fishing and canoeing are still excellent. See Appendix C for more information.

Below the Gilman Dam a canoe-only swift water stretch soon gives way to the slower waters of Moore Reservoir. This 3500-acre water body, home to bald eagles and a variety of other wildlife, is remarkable for its undeveloped shoreline, a result of its ownership by New England Power Company. This large reservoir is used by all types of watercraft and is highly valued by area residents. The impoundment of the Comerford Dam begins immediately below Moore Dam and is also usable by a variety of boats. Below Comerford, down to the Placey Farm corner in Newbury where the impoundment from the Wilder Dam begins, the water is most suitable for canoes and kayaks due to small impoundments (compared with Moore Reservoir or the Wilder pool) and frequent portages past the McIndoes Falls Dam and Ryegate Dam or swift shallow water below the dams. These dams have new portage trails, making carries around them and access easier. Residents along this section report that groups of canoes are observed on this section most summer days.

Current access sites

(note: mileage is measured in distance from Massachusetts border)

Lancaster, NH: cartop access on gravel path at Route 2 bridge; expanded access currently in planning stages by private landowner (mile 170.26)

Dalton, NH: paved cartop access just downstream from the railroad bridge, owned by Simpson Paper Company (mile 167.11)

Littleton, NH: five New England Power Co. access sites on Moore Reservoir; gravel road with paved ramps and docks, accommodate all boats,(North Littleton: mile 157.76, Dodge Hill: mile 155.21, Pattenville and Island Areas, Visitor Center: mile 153.49); NEP access below Moore Dam under Route 18 bridge (mile 152.36)

Waterford, VT: ramp and docks on Moore Reservoir, accommodates all boats, owned by NEP (mile 154.55); ramp on Comerford Reservoir, no docks, accommodates all boats, (mile 148.94)

Barnet, VT: Pine Grove Area: gravel road with paved launch on Comerford Reservoir, owned by NEP, accommodates all boats (mile 146.83)

Monroe, NH: gravel road with paved launch above Comerford Dam, owned by NEP, accommodates all boats (mile 146.3); also portage and cartop access owned by NEP at McIndoes Falls Dam, (mile 139.4)

Bath, NH: portage and cartop access at Dodge Falls Dam (mile 135)

Ryegate, VT: informal community access at Dodge Falls Dam (mile 135)

Newbury, VT: gravel ramp, no docks, accommodates all boats, owned by VT Fish and Wildlife Dept. (mile 120.01)

Haverhill, NH: municipal boat landing (mile 117.96)

- access currently planned by NH Fish and Game Dept. at Bedell Bridge State Park
- further access is over private land with the permission of the landowner

Evaluation of impact of various types of boats

Canoes: low wake; little or no other impact; use allows people to observe the river; energy use is sustainable; fits with social/cultural values agreed upon by the Riverbend Subcommittee (see objectives)

Small motor boats: low wake; little or no other impact; allows people to observe river features; uses non-renewable energy source; fits with social/cultural values

Party boats: low wake, little or no other impact; use can allow people to observe river features; uses non-renewable energy source; fits with social/cultural values

Large power boats: high wake; high shoreline impact; high wildlife impact; does not encourage awareness of river; uses non-renewable energy sources; raises question about fit with cultural values

Jetskis: high wake; high wildlife impact; high conflict with fishermen; little opportunity for awareness of river; uses non-renewable energy source; raises concern on shoreline impacts, solitude, privacy, cultural values

"Mother Nature controls the use of this river. Some places may just not be right for the big boats."

Richard Martin, Guildhall Co-chair Riverbend Subcommittee

Economic value of river recreation

Tourism and recreation are increasingly important contributors to the local economy. The results of a 1996 study of the economic contribution of water-based recreation along the Upper Connecticut River, conducted for the Riverbend Subcommittee, show that water-based recreation in the riverfront New Hampshire towns of Pittsburg to Haverhill is at least a $26 to $31 million business, creating a minimum of 650 to 750 jobs. The basis of the study was a survey of New Hampshire businesses

that provide goods and services related to water-based recreation in these riverfront towns. See Appendix C for more information.

Conditions needed to sustain river recreation

New England Power Company has earned the respect of local citizens for its creation and management of public recreation and access at Moore Reservoir. The company currently enforces a prohibition on night mooring and overnight camping on Moore Reservoir lands, particularly to reduce the hazard of forest fires. The Subcommittee hopes that NEP lands surrounding the reservoir will remain open to maintain the scenic views for which the area is well known, and to allow hiking and cross-country skiing to continue unhindered.

Other conditions important to river-related recreation are:

- excellent water quality
- preservation of current wildlife populations, especially loons, bald eagles
- responsibility for cleaning up trash around boat landings, which is presently assumed by groups of local people
- NH Fish and Game Department enforcement of snowmobiling rules
- enforcement of present boat speed laws

Potential recreational opportunities

- better trail to the river and guaranteed public access at the Wyoming dam site
- conversion of abandoned railroad corridors to trail corridors in Barnet
- expansion of low impact uses
- bicycle routes, shoulders, or paths, although some sections of Route 135 are very steep
- new trails next to the river for improved access from Littleton to Moore Dam
- overnight campsites
- riverside parks, picnic areas, roadside pullouts are a possibility, although these could present a trash disposal problem
- outfitting business potential exists at Moore Dam, where trucking assistance with the portage could be useful
- a canoe/cartop access site needed in Barnet; there is currently no site
- appropriate signage at access sites is a good idea, although the signs may sustain vandalism

◆

CURRENT PROBLEMS

The Riverbend Subcommittee considers that the impounded segments of the river are already experiencing a maximum level of use, and that there is currently no room for expansion of high impact uses, particularly of power boating on impounded sections such as Moore Reservoir, which has tripled in recent years. Concerns include: the reliance of power boating and the required facilities on non-renewable resources; maintenance costs; damage to riverfront property and associated costs to landowners and taxpayers, and loss of the peaceful atmosphere appreciated and enjoyed by the people of the region.

Other concerns include:

- inadequate state enforcement of existing boat speed laws, drunk boating, and other regulations
- ignorance or disregard of current regulations, including the boat speed and drunk boating laws by boaters
- inadequate access opportunities have led to trespassing on the property of farmers and other riverfront landowners, and abuse of private property by recreationists; however, any new access sites should be carefully located and designed to avoid bank erosion, a level of boat traffic that leads to unsafe conditions such as conflicts between power boats and swimmers or non-motorized craft, demands a level of enforcement that currently does not exist, or disturbance of sensitive areas
- bank erosion results from boat wakes on Moore and Comerford Reservoirs and elsewhere on the river. Large sized power boats are commonly used on Moore Reservoir in particular, resulting in boat chop that attacks the shoreline and causes erosion and sedimentation.
- inadequate publicity for locations of campsites which can be used overnight
- safety hazard to snowmobilers and those who drive other vehicles on the ice at Moore Reservoir, due to fluctuating water levels below the ice
- fishing derbies on Moore Reservoir can be detrimental to the resource and to the area
- water levels fluctuate as much as 6' in the McIndoes Reservoir resulting in mudflats which are unsightly and hazardous for boating
- unauthorized overnight camping has been a problem in the past on Moore Reservoir, where it is not permitted on NEP land. Until NEP undertook an expensive patrol program, abuse included damage to the shoreline and vegetation, vandalism, and littering, with the threat of forest fire
- four-wheeled off-road recreational vehicles are eroding the earth fill on Moore Dam

"Building more public access sites for large horsepower boats near shorelines susceptible to erosion is hardly progress."

Barnet Planning Commission member

Potential problems

- unsafe boating conditions
- too much traffic of any kind on the river
- water level fluctuations can impact fishing and boating activities
- development of Moore Reservoir area
- threats to wildlife from overuse of reservoirs
- accelerated bank erosion from boat wakes
- access site on the north side of Comerford Dam has been much more heavily used, primarily by local people, in the last two years, and may become overused
- Johnny Walker pit in Gilman would not make an ideal public access site, as suggested by the Moore Planning Project, because of the difficulty of access from the highway and difficulty of supervision
- use of Moore Reservoir for high-speed racing tournaments, as suggested by Moore Planning Project, could have negative impacts upon the river and other river-related recreation, and jeopardize the rural nature of the river
- blocking off access roads to areas where vandalism occurs, particularly Dodge Hill, such as suggested by the Moore Reservoir Planning Project, is not feasible because it will likely lead to increased traffic by four-wheelers
- there is presently no rescue equipment at Moore Reservoir

"Our town is concerned about recreational abusers."

Dalton selectman

◆

OBJECTIVES

The Riverbend Subcommittee seeks a prosperous rural lifestyle with quality leisure time, and a warm and homey environment in which the urban members of the family feel welcome. Recreational opportunities should be available for extended family and friends in a pleasing, clean environment with abundant, healthy and clean food, water, and air. Clean shorelines that are stable are part of this healthy environment.

Moore Reservoir is a highly valued resource that is singular for its large size and undeveloped state, in a region that otherwise has many large, intensively used lakes with developed shorelines. The Moore Reservoir Planning Project (a discussion among members of the public from both sides of the river and New England Power Company as the major landowner around the reservoir) and the Riverbend Subcommittee agree that Moore Reservoir should remain undeveloped and as wild as possible.

◆

RECOMMENDATIONS

STATE GOVERNMENT

Fish and game/wildlife departments *should:*

- minimize the impacts of boat wakes on the riverbank by discouraging use of the river by high-speed, high-powered boats particularly near sensitive banks by not constructing more public access sites to accommodate them
- plan public boating access to avoid increasing erosion on sensitive shorelines; the design of boating access ramps should avoid inviting those boats which can create wakes which can erode the riverbank or travel consistently faster than the width of the river allows under current law. Access intended for canoes and small boats can be accomplished if necessary by creating a ramp with a pylon in the middle to discourage large, heavy boats. Adapt the design to the site.
- discourage further public trailered boat access to Moore Reservoir; access is now adequate; although parking spillover occurs, expansion of parking cannot be done without negatively impacting the river
- construct public access for canoes at Guildhall at the Guildhall/Northumberland bridge, with takeout at the Lancaster Bridge. Vermont should purchase site and improve the trail to the river.
- construct public access for canoes at Barnet
- encourage open communication between the public, private landowners, and private user groups, such as begun through the Moore Reservoir Planning Project
- encourage wildlife management to benefit eagles, osprey, and other species

Departments of safety *should:*

- enforce current boat speed, drunk boating, and other regulations
- establish a required boater safety course in New Hampshire
- buoy off danger areas on the reservoirs, depending upon the level of the reservoir
- confine use of high speed, high powered boats and water skiing to limited and preselected areas on Moore and Comerford Reservoirs

Water quality agencies *should:*

- consider both encroachment on the water and impact upon the banks when issuing permits for docks

TOWNS *should:*

- discourage further public trailered boat access to Moore Reservoir; access is now adequate; although parking spillover occurs, expansion of parking cannot be done without negatively impacting the river
- encourage open communication between the public, private landowners, and private user groups, such as begun through the Moore Reservoir Planning Project
- keep Moore Reservoir undeveloped and rural; investigate ways to ensure that some land along the river remains open to maintain scenic views which contribute so highly to recreation in the area
- maintain open communication about the management of Moore Reservoir and surrounding lands
- set aside more areas for quiet, low-impact use, especially on certain stretches of Moore Reservoir

"Our way of life here is worth protecting. Let's help the river maintain it."

Littleton Conservation Commission member

PRIVATE SECTOR

New England Power Company and its successors *should*:

- keep Moore Reservoir undeveloped and rural; investigate ways to ensure that some land along the river remains open to maintain scenic views which contribute so highly to recreation in the area
- maintain open communication about the management of Moore Reservoir and surrounding lands
- set aside more areas for quiet, low-impact use, especially on certain stretches of Moore Reservoir
- work with the Littleton Fire Department to provide a small rescue boat with lines and life preservers to keep at Moore Reservoir, with proper security
- undertake the following improvements to its recreation amenities: (recommendations of the Moore Reservoir Planning Project endorsed by the Riverbend Subcommittee)
    - organize boat access sites better by installing signage
    - designate parking areas for boat access sites
    - consider designating different areas of the reservoir for different uses (water skiing, sailing, fishing, canoeing, only if adequate enforcement can be maintained
- post signs at access points at Moore Reservoir, indicating potential danger zones
- control traffic by off-road recreational vehicles on the earth fill at Moore Dam

Citizens *should:*

- take more formalized responsibility for cleaning up trash at Moore boat access areas
- aid in policing the Moore Reservoir area by calling authorities when an incident occurs, not after the fact

◆

REFERENCES

Along the Northern Connecticut River: An Inventory of Significant Instream Features, Connecticut River Joint Commissions, 1994. This inventory contains the available information relating to in-stream features of the Connecticut River mainstem for both sides of the river. It covers recreational features, such as whitewater segments, boat launch sites and campgrounds. Information is presented by local river subcommittee region both in tables and on GIS-based maps at a scale of 1:63,360 (see below).

Moore Reservoir Planning Project, 1994, North Country Council. This is a report on a project funded by the CRJC Partnership Program to seek public opinion about the management and future of Moore Reservoir.

Primitive Canoe Campsite Trail, 1996, Upper Valley Land Trust. Map and site description of a series of 17 campsites established by the Upper Valley Land Trust with the support of the CRJC Partnership Program and other organizations.

Canoeing on the Connecticut River, Gary Moore and New England Power Company, 1996

MAPS

Riverbend Region - Recreation Map produced for the CRJC and the Riverbend Subcommittee by MicroDATA, with the support of VT Agency of Natural Resources, 1994. Displays surface waters, roads, railroad routes, public boat launch sites, campgrounds, waterfalls and cascades, and whitewater segments in the towns of Lancaster/Guildhall through Haverhill/Newbury, scale 1:31,680)

NOTE: This same map is presented in Along the Northern Connecticut River: An Inventory of Significant Instream Features

Northern Connecticut River, Canada to Massachusetts - 150 Foot Buffer Zone, MicroDATA, 1994. GIS map produced for the CRJC showing all NH and VT riverfront towns. Displays restricted boat speed zone within 150 feet of shore, and areas greater than 150' from shoreline, surface waters, roads, and railroad routes. Scale 1:100,000

AGRICULTURE

ON THE BANKS OF THE RIVER TODAY

Connecticut River Valley floodplain soils of the Riverbend area provided the driving force behind Europeansettlement in this region in the eighteenth century. Indeed, they inspired the monumental task of constructing the Province Road from the New Hampshire seacoast in 1770, to bring wheat and other agricultural products from the rich "Cohass Meadows" of Haverhill and the surrounding lowlands.

Prime soils

Prime agricultural soils distinguish much of the Riverbend Region's Connecticut River floodplain, where the moderated temperatures and late frosts combine with the fertile soils to provide some of the finest agricultural land in New England. Land use along the river still demonstrates the value of these soils in the historically vibrant agricultural economy and way of life in the river valley. Corn and hay are the principal crops of these rich riverbottom lands. There are also many lands which are important to farming here beyond those composed of prime soils.

Dairying has been the primary agricultural activity for over a century, but the number of family-owned farms is declining. There are a number of part-time farms, particularly along tributaries and on the uplands, whose owners rely upon outside income to maintain their operations, a trend which will likely continue. The cool climate and plentiful rainfall also provide ideal conditions for grazing beef cattle and sheep. There is currently almost no farming oriented strictly around beef production in the area. Riverfront farms, the subject of this discussion, are distinctly different in character and resource from the hill farms which are also common in the region. Many farms located at a distance from the river produce better hay than riverbottom farms.

A working landscape

The region's working agricultural and forest landscape is well appreciated by both residents and visitors. Products of the land are the direct economic mainstay of the area, and there is a secondary economic benefit to the region through tourism attracted by this landscape, and a landscape-based quality of life that appeals to year-round working residents. Those familiar sights to residents, of sweeping vistas of the river and the hills, farm buildings, and productive land surrounding it, are a blessing to the eye of a down country visitor.

Of the 9638 acres of agriculturally important soils located within one half mile of the river on the New Hampshire side, as defined by the U.S. Department of Agriculture, 35% are active and 11% have been taken out of agricultural use by development. A total of 563 acres (5.8%) of prime land have been protected from development, largely within the town of Haverhill. An additional 178 acres of non-prime soils have also been protected. Similar information is unfortunately not yet available for the Vermont side, because agricultural soils maps have not yet been adapted to a computer database.

Local agricultural lands

Guildhall, VT: Farmland predominates along the river.
Lancaster, NH: Riverfront is mostly farmland north and south of town; the Neadeau Farm is protected by easement. Almost half of the land located within ½ mile of the Connecticut River is prime agricultural land. Of these 1614 acres, 40% are in active agricultural use and 18% have been taken out of agricultural use by development.
Lunenburg, VT: There is mostly farmland along the river north of the railroad bridge; south of the bridge, riverfront land is forested.
Dalton, NH: Riverfront land is farmland in the northern section and forested in the southern part of town. Only 1/4 of the soils within ½ mile of the river are prime soils; of these, only (18%) are in active use. Seven percent of the prime soils have been developed.
Concord, VT: Riverfront land is forested and owned by New England Power Co..
Waterford, VT: Riverfront land is generally forested, with some agricultural and residential use; much is owned by New England Power Co.
Littleton, NH: Forested land, largely owned by New England Power Company, fronts Moore Reservoir and Comerford Reservoir; there are also several other private landowners. Of the 2801 acres of prime agricultural soils within ½ mile of the river, only 4% are in agricultural use, and even less (59 acres) have been developed.
Barnet, VT: There is farmland along the river.
Monroe, NH: There is mostly farmland along the river, much of which is owned by New England Power near the Comerford Reservoir. NEP leases 500 acres to local farmers. Almost 1/3 of the soils within ½ mile of the river are prime agricultural soils; of these 1306 acres, 37% are active 9% have been developed.
Ryegate VT: The open space is a mixture of farmland and forest.
Bath, NH: Land use is mostly agricultural along the river. Of the 530 acres of prime agricultural soils within ½ mile of the river, 58% are in active use, and less than 1% have been developed.
Newbury, VT: Farmland predominates along river south of Wells River.
Haverhill, NH: The land is mostly farmland along river south of Woodsville. Almost 70% of the land within ½ mile of the Connecticut River is considered prime agricultural soil, the highest percentage on the New Hampshire side in the Riverbend Region. Of these 2832 acres, 62% are in active agricultural use, and 432 of these acres are now protected from development. Development has already occurred on 18% of these prime soils, although this figure includes the Grafton County Complex, some of which remains in agricultural use.

Conditions needed to sustain local agriculture

- diversity in agricultural production
- favorable or at least not deleterious taxation policy toward agricultural land
- current supportive attitude in NewHampshire legislature toward agriculture and forestry
- assistance from Natural Resources Conservation Service and Cooperative Extension Service
- healthy general economy
- consumer recognition of the costs of food production

- consumer desire to support local agriculture
- prime agricultural soils that remain in place
- adequate and fair price for farm products

The Subcommittee examined a wide array of agriculture's tools through the lens of holistic resource management, and found that manure, compost, facility wastes, and plant material passed all of the test guidelines for beneficial nutrient management. Chemical, rock mineral and ash as nutrient sources are less desirable because of the capital outlay they require.Settling basins, plant tissue tests, cover crops, crop rotations for diversity, soil tests, and manure storage facilities are all useful tools for preventing loss of nutrients to nearby waters, but each presents a cost to the farmer. Application of septage sludge and paper mill wastes on agricultural lands is considered problematic for a number of reasons, including objectionable odor and potential toxin content.

Pest management tools that the Subcommittee recommends for use on riverfront farms include conventional tillage and no-till/low till methods, cultivation/mechanical pest controls, crop rotations, cover/smother crops, and fallowing. Chemical, organic, and biological controls are of concern because they require expenditures of off-farm resources.

Filter or protection strips to trap sediment, nutrients, and other pollutants are self-sustaining and low-maintenance, although they may represent a financial cost to the farmer. Local ordinances and conservation easements are not the ultimate answer for agriculture because they treat symptoms rather than causes, and cost money to enforce and/or comply.

Opportunities for local agriculture

- increased potential for biological diversity on agricultural lands with use of minimal tillage
- more utilization of manure as a cash crop
- barley and other small grains could be a healthy alternative crop, particularly with better marketing, to allow greater opportunity for crop rotation
- regional farmers' market
- organic vegetable farming
- better management of the tourist crop through agri-tourism: sleigh/hay rides, (which could provide another market for hay), open barns

CURRENT PROBLEMS

A farmer is unable to pass many of the costs of doing business, including pollution remediation or prevention practices and devices, on to the consumer. Dairy farmers in particular could be in a better position to set land aside for water quality protection if they had more influence on the price they are paid for their product. Those farmers fortunate enough to have a larger land base have more flexibility in this area. Marketing of local products is a key problem.

Farmland trends

Farmland trends during the last decade show a general decline in the number of farms, their acreage, and the proportion of harvested cropland. During the period 1982-7, the region experienced a loss of 10% of Caledonia County farms, 6% of Essex County farms, 16% of Coos County farms, and 10 % of Grafton County farms. While Grafton County lost 43 more farms during the following five years, Coos County actually added 19 farms, bringing its 1992 total close to 1982 levels.

The loss of acres in farmland from 1982-87 was 13%, 14%, 15%, and 11%, respectively. The percentage of the average farm's harvested cropland, which was approximately a third of the farm's total holdings, also declined during this time, from a 2% loss in Caledonia County, 8% in Essex, and 6% in Coos County, while it was unchanged in Grafton County. The average sales per acre in Coos County was the lowest for any Connecticut River Valley county in 1987, at $162.53. Farmers in Grafton County were grossing an average of $195.42, and across the river, they reaped $229.50 per acre in Caledonia County and $223.23 in Essex County.

Other problems

- bank erosion and loss of riverbottom land downstream
- manure disposal
- increasing conflicts on Route 3 among agricultural vehicles, logging trucks, and commuter and tourist traffic
- dairy farmers now pay higher taxes on their richer soils
- the status of the general economy is detrimental to the health of agriculture
- cost of manure storage facilities and spreading machinery is a problem for most farmers
- the farming population is declining and fewer young people are entering farming
- local agriculture and forestry are not adequately appreciated by the general public
- the public is not willing to pay the full cost of production
- local farmers are fighting an attitude among distant buyers and policy-makers that food cannot be effectively produced in this northern region.
- many farmers are financially forced to grow corn on riverbottom lands more continuously than is beneficial for either the soil or for water quality. Corn land is highly exposed to erosion during flooding.
- conversion of agricultural land to non-agricultural uses, because it is difficult and expensive to reclaim once natural succession is underway; at the present time, 64.5% of the prime agricultural soils available within ½ mile of the Connecticut River on the New Hampshire side are not in active agricultural use
- the price of feed grain has more than doubled in the last year alone

"We pay proper tax, federal incon tax, social securit business profi taxes, medica taxes, workman compensation taxe unemployme taxes, (Vermo farms pay sta income taxes), an finally estate taxe Every bit of th comes out of a litt hole at the end of cow's teat.

riverfront dai farm

Potential problems

- loss or diminished effectiveness of current use tax program in Vermont
- accelerated permanent conversion of agricultural land to non-agricultural uses
- loss of agricultural support infrastructure
- problems associated with monoculture, including loss of biodiversity
- an adequate land base is needed to allow megadairies to dispose of their manure

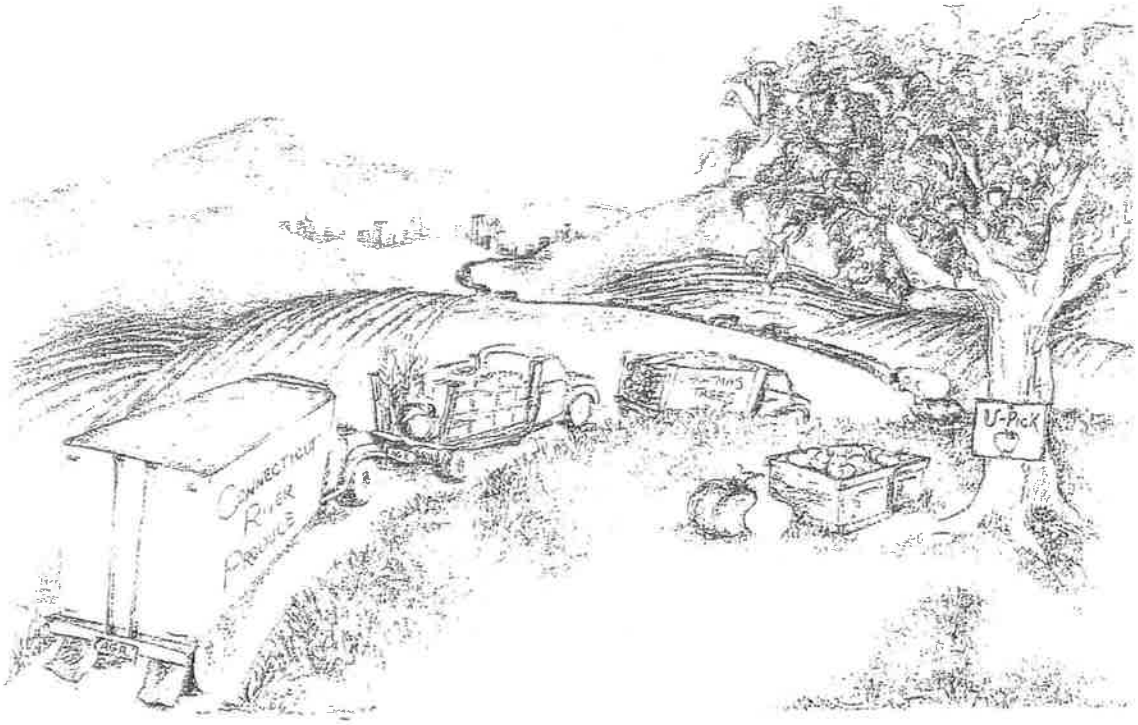
There is some concern about the emerging trend toward megadairies. Proper management and facilities will be required here to reduce the risk of pollution when more animals are crowded onto a smaller piece of land. Additionally, massive producers may be more able to influence the price of the product.

◆

OBJECTIVES

The Connecticut River and its corridor are valued in this region for their scenic qualities and the opportunities they provide for agriculture and quality of life. The Riverbend Subcommittee envisions a prosperous farming community growing quality products which command a good price. The Subcommittee seeks a future resource base of healthy, functional farms, forests, and watersheds that are forming soil, and effective water cycle leading to little flooding and few droughts, a clean shoreline,and abundant, healthy and clean food, water, and air. The rural lifestyle of farmers and their neighbors is also valued.

Actions should focus on financial incentives, market promotion, education, and building community.



RECOMMENDATIONS

FEDERAL GOVERNMENT

Congress *should:*

- ensure that taxation policy encourages agriculture

U.S. Department of Agriculture *should:*

- provide assistance for costs of soil testing for better nutrient management
- provide cost-sharing for construction of manure storage pits to help farmers eliminate winter spreading of manure within the floodplain to protect water quality
- support continued or enhanced funding for Natural Resources Conservation Districts and County Cooperative Extension Service which provide key functions for area farmers
- acknowledge the contribution part-time or hobby farmers make in keeping land open and beautiful, and encourage education of these farmers

U.S.D.A. Natural Resources Conservation Service *should:*

- ensure that soil maps are up to date

U.S.D.A. Cooperative Extension Service *should:*

- focus its efforts upon farm needs so that this key element of the agricultural community is not ignored in favor of homeowners

Federal Emergency Management Agency *should:*

- maintain accurate, up-to-date floodplain maps

STATE GOVERNMENT

Legislatures *should:*

- ensure that taxation policy encourages agriculture
- Vermont should review its current use legislation with consideration to changes to bring it closer to that of New Hampshire

Departments of agriculture *should:*

- encourage banks to develop socially responsible investment programs that promote local agriculture and forest-based economy
- assist with more and better marketing
- establish a regional farmers' market
- develop a regional identity for Connecticut River Valley products from both sides of the river
- acknowledge the contribution part-time or hobby farmers make in keeping land open and beautiful, and encourage education of these farmers
- educate the non-farm community about the value of local agriculture
- pursue public education and empowerment in conservation
- Vermont and New Hampshire should cooperate for agriculture in the Connecticut River Valley as a single region
- identify those lands which are potentially productive but are not now being used, so they could be targeted for new agricultural or forestry production, including voluntary production programs for wildlife
- encourage young people to enter farming

Water quality agencies *should:*

- offer assistance with bank stabilization where appropriate to protect farms from loss of prime soils and to protect water quality

TOWNS *should:*

- ensure that taxation policy encourages agriculture

PRIVATE SECTOR

Farmers *should:*

- practice good stewardship
- give state first refusal on purchase of farm in exchange for working farm tax abatement
- become more aware of estate tax issues and seek advice on estate planning
- use best/acceptable management practices (see Appendix D)
- make more and better use of soil testing
- practice grazing and crop rotation, keep the soil covered, maintain diversity above and below the soil, and practice low-till or no-tilling cultivation
- rotate corn frequently with other crops, particularly on flood-prone land
- conduct on-farm research to show the viability of crop diversity
- use filter or protection strips more consistently to keep sediment and nutrients from leaving agricultural lands and washing into waterways
- seek more information on the potential benefits of conservation easements (see Appendix H)
- educate the non-farm community about the value of local agriculture
- pursue public education and empowerment in conservation
- investigate potentially profitable diversified agriculture
- identify those lands which are potentially productive but are not now being used, so they could be targeted for new agricultural or forestry production, including voluntary production programs for wildlife
- build coalitions
- encourage young people to enter farming

Farm Bureaus *should:*

- assist in attracting young people to farming

◆

EXISTING PROGRAMS

- Environmental Quality Incentives Program of the 1996 Farm Bill
- Current use legislation as it now exists in New Hampshire, and to some extent in Vermont
- USDA Natural Resources Conservation Service
- Cooperative Extension Service
- Farm Services Agency
- State departments of agriculture
- State Farm Bureaus
- Connecticut River Joint Commissions' Connecticut River Agricultural Network
- CRJC Connecticut River Valley Partnership Program
- Forest Legacy Program
- U. S. Fish and Wildlife Service Conte Refuge
- State fish and game/wildlife departments
- land protection programs of land trusts, particularly those that focus upon agricultural lands

REFERENCES

Connecticut River Valley: Opening New Markets for Agriculture, Conference Proceedings and Recommendations, 1994. This report reviews a valley-wide conference sponsored by the CRJC, and presents dozens of recommendations dealing with financing, market regulations, government support, processing and distribution, agri-tourism, cooperatives and contract marketing, and community supported agriculture. Farmland trends taken from supporting research papers are also summarized.

Findings to Support Classification of Segments of the Connecticut River, Connecticut River Valley Resource Commission, 1991. These findings, prepared with the help of citizens along the length of the river, nominated 34 specific segments of the river in several categories for classification and instream protection through the New Hampshire Rivers Management and Protection Program.

The Watershed Guide to Cleaner Rivers, Lakes, and Streams, Brian Kent, 1995. Liberally illustrated, this guide describes the causes of nonpoint pollution, suggests ways to reduce and prevent it from reaching waterways, and provides basic ideas that citizens can use to help improve water quality in the valley. The report covers a number of best management practices for construction sites, developed areas, backyards, septic systems, gravel and sandpits, marinas, farms, golf courses, woodlots, and storage of hazardous materials, and includes a useful directory.

Series of GIS maps produced for the Riverbend Subcommittee by North Country Council with the support of NH DES, 1996.
Agriculturally Important Soils,. Dalton-Lancaster, NH. GIS map of all agriculturally important soils within ½ mile of the Connecticut River, as defined by the Soil Conservation Service. Soils are distinguished as in active agricultural use or inactive, both protected and unprotected from development, and those soils lost to development. Total acreage of each category are provided.
Agriculturally Important Soils, Haverhill-Littleton, NH. (As above)

FORESTRY

FORESTS AND THE CONNECTICUT RIVER

Forest land is intimately associated with the health of the river, affecting its water quality, its wildlife habitat, its fisheries, and the variety of scenery and recreational opportunities long associated with the region. Forest land is owned by forest products companies, smaller landowners, and also by farmers who own tracts of wooded lands in addition to their farmland.

The river corridor within the Riverbend Region is predominantly forested or in agricultural use. As is true of the region studied by the Headwaters Subcommittee, so too the forest in the Riverbend sector varies from large tracts to small forested strips which border the river, interspersed with open farmland or developed areas. Within the Riverbend area, New England Power Company currently owns some 8000 acres, 6000 of which are located around Moore Reservoir, providing a variety of recreational and tourism opportunities for the public. NEP holdings are in active forest management, except for 500 acres leased to local farmers.

Present condition of the forest

The three classic forest types in the Riverbend region are northern hardwood, spruce/fir, and white pine. In general, forested lands are under increasing pressure to be converted to other land uses, or to become intensively used in providing raw materials for the forest products industry. Forest land comprises 87% (about 5 million acres) of New Hampshire's total land area, and 80% of Vermont's. Seventy percent of this forested land is privately owned in New Hampshire and 88% in Vermont. More than half of New Hampshire's forest land is in the three northern counties of Carroll, Grafton, and Coos.

The forest throughout northern New Hampshire and Vermont is generally in good health. (1) However there are cyclic losses, such as tree mortality associated with repeated insect infestation. Although forests normally rebound from disease, the resulting stress leaves them increasingly susceptible to future insect attack, or such environmental injury as can be brought on by prolonged drought, root disturbance, acid rain, and salt. Recently, for example, there is a growing concern among foresters for the long-term health of maple and hemlock trees, species common in the Riverbend region. The continued health of the forest is of prime importance, not only to the people of the region but also to the public at large.

The forest products industry

In New Hampshire as a whole, the forest products industry ranks fourth in employment and wages among the state's manufacturing industries. Forest-based economic activity in the state accounts for 7% of New Hampshire's employment and 4% of the state's overall payroll. Some 16,000 employees and entrepreneurs generate an annual $300 million which is returned to this state as revenue in exchange for goods produced. On the west side of the river, 12,000 Vermonters are employed in the forest products industry.

In the Riverbend region, forest management and industry is a primary land use and employer. There are three biomass plants in the area, in Ryegate, Bethlehem, and

Whitefield, which convert wood chips to electricity, produce 9.6% of the electricity currently used in New Hampshire. Each plant is capable of consuming 20 tons of wood chips per hour. The three northern counties of New Hampshire are home to 24 sawmills which produce over one million board feet annually and 10 smaller sawmills. DCI Lisbon since 1983 has manufactured furniture for educational and health care facilities. Lumber consumption for this enterprise is in the neighborhood of 2.5 million board feet annually (including wood from a sawmill in Vermont). Opportunities in wood product manufacturing are in furniture making, furniture parts, millwood, pallets, and hardwood flooring. Wood pulp and paper manufacturing are the dominant forms within the total wood products industry.

Environmental and recreational considerations

From an environmental standpoint, the region's forests perform a critical role in the overall health of the river corridor. Forests collect, clean, regulate, and recycle the water we drink and the air we breathe. Forests provide habitat for many species of wildlife.

Recreational and tourism activities also depend partly upon the forests of the region. The diversity of species within the northern forests accounts for the virtual explosion of visitors in the fall of each year. From great distances people come to view the foliage because of the variety of colors in the northern forests, not readily found elsewhere. In recent years, fall tourism has generated $213 million statewide in New Hampshire and given employment to some 13,700 persons.

Conditions needed to sustain these uses and values

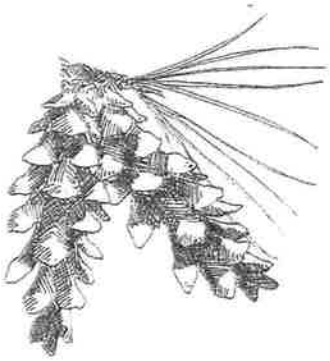
Good forest stewardship requires a long term commitment by landowners to conserve their forest resource through careful management. Maintaining a healthy forest, protecting wildlife habitat to the maximum degree possible, and attention to the maintenance of water quality should be high priorities throughout the region. In addition to licensed foresters, who can provide guidance and counsel to landowners regarding present and future use of their lands, each state has laws regulating logging, as well as regulations governing river, stream, and wetland protection.

Riparian buffers are crucial to the protection of the water resources of Vermont and New Hampshire. Riparian forested buffers improve water quality by filtering and storing sediment and other pollutants, maintaining stream flow, controlling stream temperature, and stabilizing streambanks and reducing erosion.

Future benefits of good forest use

- healthy, sustainable forest management for timber products
- more value-added uses of forest products
- excellent water quality in Connecticut River, received by its tributaries

  these depend upon:
- adherence to best management practices for timber harvesting (see Appendix D)
- acceptance of American Forest & Paper Association standards (see Appendix E)
- landowner awareness of the many values of streamside forests
- landowner development of management plans for their forests
- use of forested riparian buffers to trap pollutants and reduce flooding
- tax structure which allows landowner to keep land long enough to manage it well



CURRENT PROBLEMS

- negative perceptions of forestry by the public; particularly objection to clearcutting and slash disposal near waterways, on the grounds of aesthetics and potential water quality impacts
- need to truck high value logs over long distances is a hardship which may force local use of valuable timber for lower value products
- markets are distant
- high costs of workmen's compensation in this industry
- enforcement of best management practices is better in New Hampshire than in Vermont, although there may be inadequate enforcement of violations due to limited budget ability of the NH Division of Resources and Economic Development to pursue repeat offenders in court

"If you leave a mess where the public sees it, it gives all forestry a bad name, and people will be asking for more regulation."

forest landowner, Riverbend region

Potential problems

- major clearcutting on steep slopes near the Connecticut River can cause erosion that sends sediment into streams, threatens fisheries, and accelerates the build up of sediment behind dams. Extensive clearcutting also changes the water retention ability of the watershed, and leads to increased runoff. These can pose a number of problems downstream, including increased flooding, riverbank erosion, and problems at industrial water intakes.
- siltation from improperly constructed skid roads
- inadequate buffers
- bank erosion

◆

OBJECTIVES

The Riverbend Subcommittee seeks good forest management that provides a sustainable harvest, provides raw materials and jobs for the forest products industry while maintaining water quality and a healthy recreation and tourism industry.

◆

RECOMMENDATIONS

STATE GOVERNMENT

Forest resources agencies *should:*

- educate landowners and public on stewardship, erosion, value of forested riparian buffers
- reduce costs of workmen's compensation
- enforce best/acceptable management practices and follow up on water quality violations

PRIVATE SECTOR

Loggers and landowners *should:*

- follow best/acceptable management practices for timber harvesting
- recognize that there is a public relations value to good forest management
- maintain forested riparian buffers; the appropriate depth for a buffer depends upon soil conditions, slope, and tree species
- dispose of slash away from streams and out of public view
- minimize the aesthetic and water quality impacts of clearcutting and other timber harvesting operations, particularly near the river

REFERENCES

The Economic Importance of the Northeast Forest, Northeastern Forest Alliance, June 1993

The Forest Resources and Wood Using Industries of NH, State of NH, Division of Forests and Lands, June 1993

Finding Common Ground: Conserving the Northern Forest, Northern Forest Lands Council, Concord, NH, 1994. This report presents the findings and recommendations of the collaborative effort to reinforce the traditional patterns of land ownership and uses of large forest areas in the Northern Forest of New Hampshire, Vermont, New York, and Maine.

Draft New Hampshire Forest Resources Plan, State of NH, Division of Forests and Lands, Sept. 1995

The Watershed Guide to Cleaner Rivers, Lakes, and Streams, Brian Kent for the Connecticut River Joint Commissions, 1995. Liberally illustrated, this guide describes the causes of nonpoint pollution, suggests ways to reduce and prevent it from reaching waterways, and provides basic ideas that citizens can use to help improve water quality in the valley. The report covers a number of best management practices for construction sites, developed areas, backyards, septic systems, gravel and sandpits, marinas, farms, golf courses, woodlots, and storage of hazardous materials, and includes a useful directory.

HISTORICAL & ARCHEOLOGICAL FEATURES

HISTORY ALONG THE RIVER

The Connecticut River has long woven the natural and cultural fabric of the valley together to create the industrial and agricultural heritage of the Riverbend Region. The rich soils forming the basis for an agricultural history of thousands of years are a gift of the river. The forest products industry has depended upon the river for its power, and once also to move its raw products to market. There are abandoned gold and silver mines and prospects in the towns of Littleton, Monroe, Lyman and Bath, tapping the Gardner Mountain mineral belt that crosses the river.

Throughout the region, historic rural agricultural landscapes and building complexes along the river mingle with village clusters that retain their nineteenth century flavor. The Riverbend Region is well known for its covered bridges, which join dirt roads, stone culverts, and stone walls as historic etchings on the landscape.

A look at history in the towns

The following summary of local historic features comes from the river's nomination to the New Hampshire Rivers Program, prepared by a working group of local citizens. It is augmented with information from the CRJC's recent report, *The Cultural Landscape of the Connecticut River in New Hampshire and Vermont*.

Guildhall, VT: The oldest community in northeastern Vermont, Guildhall was settled in 1764 and features a traditional town common surrounded by older buildings. An old railroad bridge stone arch remains in a field. Old cemeteries are set near the river opposite the intersection of North Road and in South Guildhall. There was an Abenaki settlement on the bluff above the Call property. The smallest shire town in Vermont, Guildhall contains Greek Revival buildings illustrating the development of a rural county seat (National Register district).

Lancaster, NH: Marker indicates site of first Weeks cabin (old Lancaster family) near the river. Stockwell Farm is identified with an historic marker. A c. 1885 Eastlake-style residence remains on Bunker Hill Street, and the Wilder-Holton House is listed on the National Register. Coos County's first two story dwelling, whose construction was halted temporarily during the "Dark Day" of May 19, 1780, is now a museum of the Lancaster Historical Society. The house was built with boards planed and nails wrought on the site, and originally possessed a four-fireplace chimney and "Indian"shutters. The Weeks State Park fire tower is listed on the National Register.

Lunenburg, VT: The Mt. Orne Covered Bridge is listed on the National Register of Historic Places.

Dalton, NH: Abutments mark the site of an old ferry to Lunenburg. Below the current railroad crossing and visible when the water is low are the pilings for the original railroad

bridge. This area was the head of Fifteen Mile Falls before the dams were built. Half a mile below the railroad bridge, a channel was blasted out of the rock to aid the logging drives, and is visible at low water. The Sumner House, a 19th century hotel, was located near the intersection of Route 135 and Simons Road.

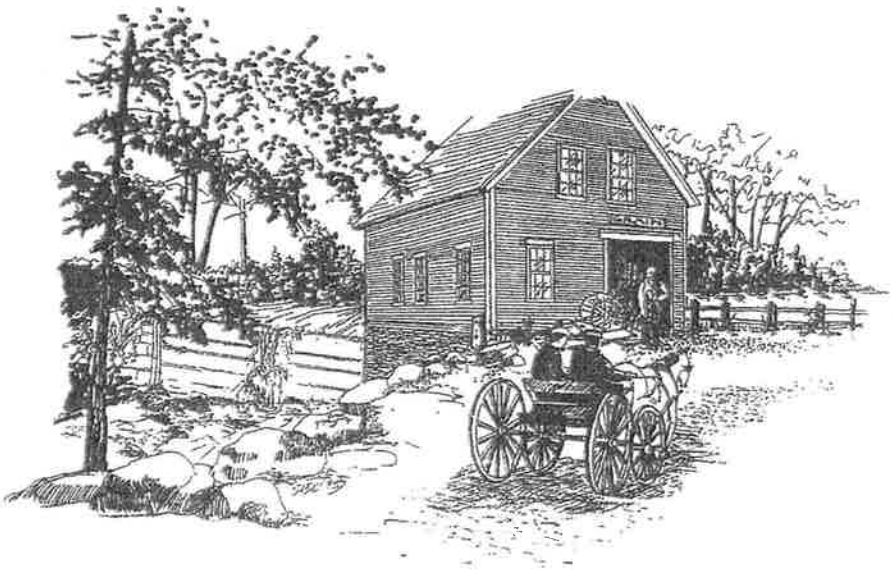
Littleton, NH: The Kilburn Brothers Stereoscopic View Factory produced and distributed thousands of stereoscopic views from 1867-1909, providing popular parlor entertainment. The Littleton Community House remains a source of community pride. The 1850 Greek Revival-style Thayer Hotel across the street was built in anticipation of the arrival of the railroads and tourism (National Register). The 1895 Town Building and Opera House are Queen Anne-style buildings listed on the National Register.

Waterford, VT: The Rabbit Hill section of historic buildings includes an old meeting house. West View Farm, a representative 19th century farm included a 1903 round barn designed by noted Vermont architect Lambert Packard, is listed on the National Register. The barn has been removed to the Shelburne Museum. Lower Waterford contains an historic district. The Lee Farm is listed on the National Register of Historic Places.

Barnet, VT: A 1930 Steel Parker Truss Bridge connects Monroe to McIndoe Falls. The picturesque villages of Barnet and McIndoe Falls were settled by Scots. There are National Historic Districts in Barnet Center and McIndoe Falls. The Lind Houses and McIndoes Academy are listed on the National Register of Historic Places.

Monroe, NH: A narrow spot in the river was famous for jams during the log drive era. Lisbon is a paper-mill-based community with a charcoal kiln that burned pine scrap from lumber. A 1930 Steel Parker Truss Bridge spans the river between Monroe and McIndoe Falls.

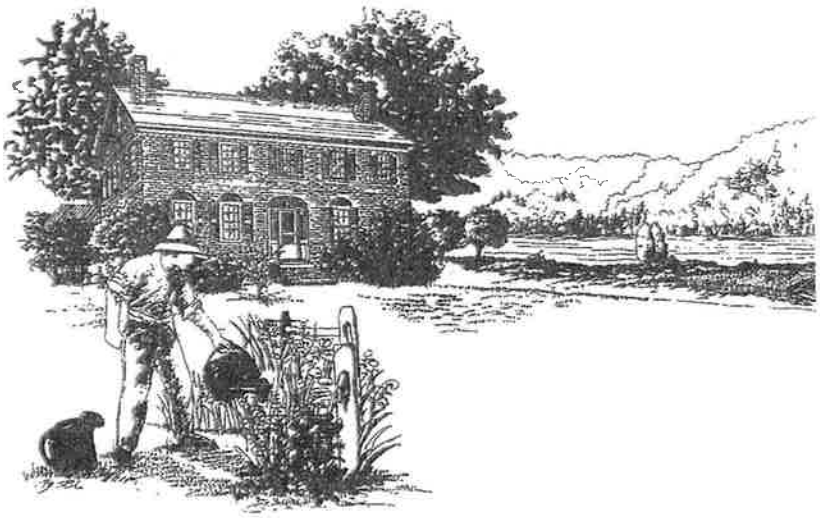
Bath, NH: In the narrows there was a dance hall on pontoons in the river during the Gay 90's. The narrows was also a log jam site during the days of the drives. The Bath-Haverhill covered bridge is the oldest documented covered bridge in the United States. The Brick Store, built 1824 and now listed on the National Register, is one of the earliest commercial buildings in New Hampshire, and survives much in its original setting. The front of the store includes a Doric portico and second floor porch. Its exterior rear wall served as a billboard for passengers on passing trains. It is considered the oldest continuously operating brick store in the U.S. The Upper Village, a National Register District, is a group of early 19th century brick Federal style residences, including one with an unusual two-story semi-circular bay.



Ryegate, VT: Linen textile manufacturing in a Scotch-Irish community. The Whitehill House is listed on the National Register of Historic Places. East Ryegate has a state-listed historic district.

Newbury, VT: Site of Rogers' Rangers fort at the confluence with the Wells River, and Indian Joe's cave (according to town legend, Indian Joe helped the early settlers). Indian settlements have been excavated by the University of Vermont. Ryegate was the limit of navigation for river boats coming upstream; goods were transferred to land transportation in Wells River and Woodsville. It was the first settlement north of Fort No. 4. A village known as Kowasek, located in a large fertile river oxbow, was occupied about 1670 by a band of Sokoki who moved from Northfield, Mass.; nearby are other archeological sites whose settlements date from 1300 to 2500 years ago. Newbury was settled in 1763 when General Jacob Bayley, veteran of the Indian wars, led a migration of settlers from Newbury Mass to the fertile land of a great oxbow in the river. In 1776-79, Bayley constructed a road from Newbury 54 miles northwest, intending to create a better route for American Revolutionaries to invade Canada than through British-controlled Lake Champlain. It was never used for an invasion, but after Moses Hazen extended the road, the Bayley-Hazen road became an avenue for trade and settlement. Resulting hilltop settlements along the highland roads remain. There are several National Register districts, including the South Newbury Village, Oxbow, Bayley, Newbury Village, and Wells River Village historic districts. Listed on the National Register of Historic Places are the Newbury Town House, Wildwood Hall, and the Wells River Graded School building. A 1923 Steel Through Arch Bridge connects Haverhill and Newbury.

Haverhill, NH: The Cornerstone project includes 54 historic houses. Haverhill at Woodsville was an important railroad connection with Wells River. A 1923 Steel Through Arch Bridge connects Haverhill to Newbury. The railroad bridge had a car bridge below it, and there is a surviving depot from the regional rail center. Particularly rich agricultural land inspired early settlement, the building of roads, and the establishment of agriculture in the region in the alluvial floodplains known then as the Cohass or Coos area. The Province Road was the second major road into the Connecticut River Valley, built about 1773 from Concord, NH to northern Haverhill. Haverhill became the northern terminus of the Coos Turnpike in 1808, spurring growth of a town center that included such structures as the Grafton Hotel, raised in 1810 as a Federal-style tavern, and Greek Revival-style civic and church buildings, now part of a National Register District. Returning veterans of the French and Indian wars brought back news of the area's agricultural possibilities as early as 1761, when it was discussed in the Assembly. A site marker commemorates the pre-arranged rendezvous for Rogers' Rangers after their destruction of St. Francis, Quebec



in 1759. After pursuing Indians and starvation plagued their retreat, the Rangers found the expected rescue party with food had come and gone. "Many rangers perished and early settlers found their bones along these intervales," reads the marker. There are several important archeological sites immediately adjacent to the river.

A future for the past

The key to sustaining the familiar presence of these historic features lies not only in Yankee ingenuity and a recycling instinct that can find new uses for old structures, but also in an economically viable agriculture that will allow farming to continue to keep familiar farm landscapes open and working as they have for centuries.

Tourists in the region could be attracted by and better appreciate the Riverbend Region's history and pre-history, bringing dollars into the area by respectful visitors interested in heritage tourism. Success depends upon careful education and promotion of the rural historic values of the region with respect of private property rights by visitors and residents alike. Adaptive reuse of historic buildings could be encouraged, rather than razing, rebuilding, and/or development of commercial sprawl outside the historic village center. New development that minimizes its visual impact on agricultural landscapes could be encouraged.

◆

CURRENT PROBLEMS

- neglect, decay
- loss of stone walls through road widening projects, insensitive development, pilfering for the residential home landscape
- property owners have torn down their historic barns because of the tax burden they represented

Potential problems

- loss of agricultural landscapes and identity of historic village clusters
- decay and removal of agricultural outbuildings by non-farming owners
- vinyl siding threatens character and structural integrity of historic buildings
- bank erosion exposing archeological sites, such as in Haverhill
- looting of archeological sites
- deterioration of historic bridges if they are taken out of service and maintenance funds are not available

◆

OBJECTIVE

The Riverbend Subcommittee encourages communities and the private sector to help keep the character of the region while people continue to live and work here.

◆

RECOMMENDATIONS

STATE GOVERNMENT

Historic resources agencies *should:*

- encourage bank stabilization to protect archeological sites
- provide education for town officials, students, homeowners on historic resources
- pursue greater cooperation with local people
- retain historic covered bridges and provide educational signs for visitors and residents
- direct funding towards projects which are meaningful to local people
- work with state transportation agencies to establish fund for maintenance of historic bridges

TOWNS *should:*

- encourage a multi-community cooperative approach to developing heritage tourism

Regional planning commissions *should:*

- assemble information on sites and features of historic and archeological significance in each town, in conjunction with Scenic Byway Study
- provide this information to local historical societies and town officials

PRIVATE SECTOR

Historical societies *should:*

- educate their fellow citizens about local history and how it relates to the Connecticut River; consider writing and publishing histories of their town and conducting oral history interviews
- encourage the media to carry features stories on local history topics
- participate in the Scenic Byway Study to be certain that it is responsive to their area's interests and concerns and provides their towns with the information they will find most useful; work with North Country Council and Northeast Vermont Development Association

◆

EXISTING PROGRAMS TO SUPPORT LOCAL HERITAGE

- CRJC's Connecticut River Valley Partnership Program
- State Historic Preservation Office review of federally-funded projects
- Vermont "Barn Again!" program to assist in restoration/rehabilitation of historic barns
- Certified Local Government program in both Vermont and New Hampshire to provide federal funds for locally inspired historic projects
- Scenic Byway Study

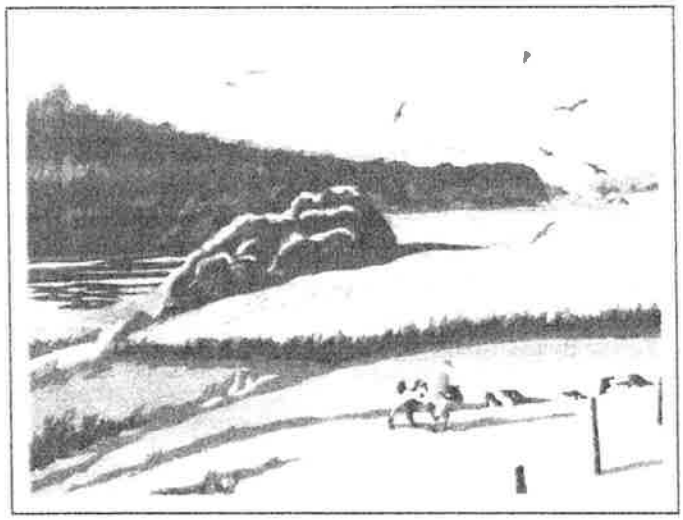
◆

REFERENCES

Cultural Landscape of the Connecticut River in New Hampshire and Vermont, Richard Ewald, draft report 1995, final report in publ. An illustrated report to the National Park Service from the CRJC, covering pre-history and early settlement, transportation, agriculture, industry, conservation, culture and government, architecture and settlement patterns, and tourism and recreation. Includes maps identifying selected sites of interest in each subject.

Findings to Support Classification of Segments of the Connecticut River, Connecticut River Valley Resource Commission, 1991. These findings, prepared with the help of citizens along the length of the river, nominated 34 specific segments of the river in several categories for classification and instream protection through the New Hampshire Rivers Management and Protection Program.

Appendices to the Riverbend Region Plan



ACKNOWLEDGMENTS

The strength of this plan lies largely within its creation by a cross-section of local citizenry. From time to time, however, the local subcommittee called upon the expertise of state agencies and other professionals to educate them about issues of particular concern. We would like to express our gratitude to those who lent their time to share information with the Riverbend Subcommittee:

Larry Bandolin, U. S. Fish and Wildlife Service
Todd Bogardus, NH Fish and Game Department
Nick Comerci, Natural Resources Conservation Service
Scott Decker, NH Fish and Game Department
Dick Flanders, Surface Water Quality Bureau, NH Department of Environmental Services
Len Gerardi, VT Fish and Wildlife Department
Willie Gibson, University of Vermont Cooperative Extension Service
Dennis Goodwin, Supervisor of Comerford Station, New England Power Company
Dick Haldeman, Natural Resources Conservation Service, Coos County, NH
Mike Kline, Water Quality Division, VT Agency of Natural Resources
Jim MacCartney, Rivers Coordinator, NH Department of Environmental Services
Tim McKay, Natural Resources Conservation Service, Essex and Caledonia Counties, VT
Gary Moore, Bradford, VT
Norm Olson, U.S. Fish and Wildlife Service
Eric Palmer, VT Fish and Wildlife Department
Steve Schmidt, Farm Services Agency, Grafton County, NH
Nat Tripp, VT River Commissioner, Barnet, VT
Steve Turaj, Cooperative Extension Service, Coos County, NH

We are particularly grateful to the Town of Littleton for providing meeting space in the Littleton Community House.

Technical assistance
Mapping and other technical assistance was provided by the North Country Council (NH) , the Northeastern Vermont Development Association, the Conte Refuge Planning Project of the US Fish and Wildlife Service, the New England Interstate Water Pollution Control Commission, Upper Valley Land Trust, the VT office of the National Wildlife Federation, VT and NH Natural Heritage Inventory Programs, Natural Resources Conservation Service, Cooperative Extension Service, VT and NH offices of historic preservation, and the Connecticut River Watch Program.

Illustrations
The Connecticut River Joint Commissions are pleased to feature the artwork of Connecticut River Valley artists in this publication.
Matt Brown of Lyme, NH created the cover illustration using a self-taught method which pursues the tradition of color woodbock printing developed in Japan during the 18th century. Each color is printed from a separate carved block, using rice paste as the binder and a hand-held baren and brushes as the printing tools. Matt is a state-juried member of the League of NH Craftsmen.

Joan Waltermire of Flying Squirrel Graphics in Vershire, VT is the creator of pen and ink drawings of fish and wildlife, seen in Vermont Woodlands magazine and other publications.
Susan Berry Langsten of Cottage Designs in Lebanon has contributed her pen and ink drawings to other CRJC publications, including the Challenge of Erosion and The Cultural Landscape of the Connecticut River Valley in New Hampshire and Vermont
Cheryl Sallen, a freelance graphic artist of Reading, Vermont, created the maps in consultation with Bill Bridge of the Upper Valley Land Trust.

Design and Printing
Susan MacNeil prepared the design of this publication with the assistance of Kelly Short of Canterbury Communications in Canterbury, NH. Printing is by Letter Man Press of Claremont, NH. Sharon Francis provided final editing and oversight.

Funding to support the work of the Riverbend Subcommittee came from:
NH Department of Environmental Services
VT Agency of Natural Resources
Rivers and Trails Conservation Assistance Program of the National Park Service

Funding for this publication came from:
Town of Dalton
NH Department of Environmental Services
New England Power Company
Rivers and Trails Conservation Assistance Program of the National Park Service
John F. and Dorothy H. McCabe Environmental Fund, NH Charitable Foundation

APPENDIX A

THE NEW HAMPSHIRE RIVERS MANAGEMENT & PROTECTION ACT (RSA 483)

The 1992 designation of the Connecticut River into the New Hampshire Rivers Management and Protection Program established the following criteria and management practices.

ALL RIVER SEGMENTS

- management shall ensure rights of riparian owners to use the river for forest management, agricultural, public water supply, and other purposes compatible with instream public uses
- DES shall review and consider adopted local river corridor management plans before issuing permits
- water quality shall be restored to or maintained at least at the Class B level; significant adverse impacts on water quality or other instream public uses shall not be permitted
- no permanent channel alteration, including dredging, shall be permitted except for construction or maintenance of a project such as public water supply intake
- DES shall encourage vegetative bank stabilization
- land application of solid waste (except manure, lime, wood ash, sludge, septage) shall be immediately incorporated into the soil, and set back 250' from normal high water mark
  no new solid waste landfill within 500 year floodplain; any new landfill to be set back at least 100' from edge of floodplain and screened; may be 250' from river if outside 500 year floodplain
- any existing solid waste facility within 250' of river may continue to operate under existing permit provided it does not degrade beyond permit area
- protected instream flow level shall be established by DES
- no interbasin transfers of water shall be permitted
- motorized boats operating within 150' of shore shall travel at the slowest possible speed necessary to maintain steerage way, but at no time shall exceed 6 miles/hour (pre-existing state law)

◆

NATURAL RIVER SEGMENT

- free-flowing segment of at least five miles in length
- high quality of natural and scenic resources
- shorelines in primarily natural vegetation; river corridors generally undeveloped
- development, if any, is limited to forest management and scattered housing
- minimum distance to paved public road is 250' except where sight and sound are screened by natural barrier
- management shall perpetuate natural character as defined above, and ensure rights of riparian owners to use the river for forest management, agricultural, public water supply, and other compatible purposes (in addition to that described above)
- no dam or other structure that alters natural character of river shall be constructed
- no channel alteration activities except temporary alterations to repair or maintain bridge, road, or riprap which was in place at time river was designated
- water quality shall be maintained at Class A or B or restored to Class A
- no new solid waste facility permitted in corridor; existing, permitted and secure landfill cannot be expanded within 100' of the 500 year floodplain, and must be visually screened with vegetation
- no new hazardous waste facilities storing for more than 90 days permitted within corridor
- non-motorized watercraft only except for emergency purposes

In the entire Connecticut River in New Hampshire and Vermont, only one *natural* segment has been designated:in the Headwaters, from Wheeler Stream in Brunswick, VT to the Maidstone-Stratford Bridge. (7 miles)

◆

RURAL RIVER SEGMENTS

- river corridors are partially or predominantly used for agriculture, forest management, dispersed or clustered residential development
- some instream structures may exist, including low dams, diversion works, and other minor modifications
- no minimum distance for roads
- at least three miles in length
- existing water quality at least Class B or restorable to Class B
- management shall maintain and enhance natural, scenic, and recreational values of the river protection (in addition to that described above)
- no new dam shall be constructed; repair of failed dam permitted only at same location, same impoundment level within six years of date of failure
- new hydropower facilities may be allowed at existing dams only if they are run-of-the-river, include no significant diversions, and impoundment height is constant and not above maximum historic level

In the Riverbend Region, six segments of the Connecticut River are designated as *rural*:

- from one mile below the breached Wyoming Dam to a point .3 miles above the Simpson Paper Co. Dam (18.6 miles)
- from .3 miles below the Simpson Paper Co. Dam to a point .4 miles above Moore Dam (10.2 miles)
- from a point .6 miles below Moore Dam to a point .3 miles above the Comerford Dam (9.5 miles)
- from a point .2 miles below the McIndoe Falls Dam to a point .3 miles above the Ryegate Dam (3.4 miles)
- from a point .2 miles below the Ryegate Dam to the Ammonoosuc River in Bath, NH(3.8 miles)
- from the intersection of Routes 135 and 10 in Haverhill south to Hanover, NH (40.0 miles)

The towns of Lancaster, Dalton, Littleton, Monroe, Bath, and Haverhill, NH should honor the stipulations of this designation. Guildhall, Lunenburg, Concord, Waterford, Barnet, Ryegate, and Newbury, VT should also consider these provisions.

◆

RURAL-COMMUNITY RIVER SEGMENTS

- flow through developed areas with existing or potential community resource values such as those defined in official town plans or land use controls
- river corridor has combination of open space, agricultural, residential, commercial, industrial land uses
- readily accessible by road or railroad
- may include impoundments or diversions
- at least three miles in length
- existing water quality at least Class B or restorable to Class B
- management shall maintain/enhance the natural, scenic, recreational and community values of the river
- management shall include rights to use river for residential, recreational, commercial, industrial, flood control and other community uses as noted
- no new dam shall be constructed; repair of failed dam permitted only at same location, same impoundment level and only within 6 years of date of failure
- new hydropower facilities may be allowed at existing dams only if they are run-of-the-river, include no significant diversions, and impoundment height is constant and not above maximum historic level

In the Riverbend Region, there are no segments designated as *rural-community*.

◆

COMMUNITY RIVER SEGMENTS

- flow through developed or populated areas and possess existing or potential community resource values such as those identified in official town plans or land use controls
- combination of open space, agricultural, residential, commercial, industrial land uses; may include urban centers
- readily accessible by road or railroad
- may include existing/potential impoundments, hydropower diversions, flood control, water supply
- at least one mile in length
- existing water quality at least Class B or restorable to Class B
- management shall maintain/enhance natural, scenic, recreational, and community values of river
- management shall include rights to use river for hydroelectric energy production and flood control protection in addition to that described above)
- new dams permitted if consistent with protection of resources for which segment designated, and only if they are run-of-the-river, include no significant diversions, and impoundment height is constant and not above maximum historic level for site

In the Riverbend Region, six segments of the Connecticut River are designated as *community:*

- from one mile above the breached Wyoming Valley Dam to one mile below the dam stie (2.0 miles)
- from a point .3 miles above the Simpson Paper Company Dam to .3 miles below the dam (.6 miles)
- from a point .4 miles above Moore Dam to a point .6 miles below Moore Dam (1.0 miles)
- from a point .3 miles above Comerford Dam to a point .2 miles below McIndoe Falls Dam (2.3 miles)
- from a point .3 miles above Ryegate Dam to a point .2 miles below Ryegate Dam (.5 miles)
- from the Ammonoosuc River to the point where Routes 135 and 10 meet in Haverhill (1.9 miles)

The towns of Dalton, Littleton, Monroe, Bath, and Haverhill, NH should honor the stipulations of this designation. Guildhall, Lunenburg, Waterford, Barnet, Ryegate, and Newbury, VT should also consider these provisions.

APPENDIX B

NEW HAMPSHIRE COMPREHENSIVE SHORELAND PROTECTION ACT (RSA 483-B)

Minimum protection measures defined by this Act appear below. The Connecticut River and others designated into the New Hampshire Rivers Management and Protection Program before January 1, 1993 are presently exempt. Shoreland protection for these rivers is the responsibility of riverfront communities and, in the case of the Connecticut River, the CRJC and the local subcommittees. In the event that the New Hampshire cities and towns along the river do not adopt the proposals made in the plan prepared by their local subcommittee, the legislature will re-examine the exemption provided in RSA 483-B and propose minimum standards defined by the Act for the area within 250 feet of the river's ordinary high water mark. In either case, the riverfront community must adopt river protection standards into its local zoning ordinance.

For further information, contact the Shoreland Coordinator at NH Dept. of Environmental Services at 603-271-3503.

LIMITS WITHIN THE PROTECTED SHORELAND — 250 ft

- Prohibited Uses:
  - Establishment/expansion of salt storage yards, auto junk yards, solid waste & hazardous waste facilities.
  - Use of fertilizer, except limestone, within 25 feet of the reference line. Low phosphate, slow release nitrogen fertilizer allowed beyond 25 foot zone.
- Uses Requiring State Permits:
  - Public water supply facilities
  - Public water & sewage treatment facilities
  - Public utility lines
  - Existing solid waste facilities
  - All activities regulated by the DES Wetlands Bureau per RSA 482-A

OTHER RESTRICTED USES

- All new lots, including those in excess of 5 acres, are subject to subdivision approval by DES.
- Setback requirements for all of new septic systems are determined by soil characteristics.
- Minimum lot size in areas dependent on septic systems determined by soil type.
- Alteration of Terrain Permit standards reduced from 100,000 square feet to 50,000 square feet.
- Total number of residential units in areas dependent on on-site sewage & septic systems, not to exceed 1 unit per 150 feet of shoreland frontage.

NATURAL WOODLAND BUFFER RESTRICTIONS — 150 ft

- Where existing, a natural woodland buffer must be maintained.
- Tree cutting limited to 50% of the basal area of trees, and 50% of the total number of saplings in a 20 year period. A healthy, well-distributed stand of trees must be maintained.
- Stumps and their root systems must remain intact in the ground within 50 feet of the reference line.

NEW SEPTIC SYSTEM LEACHFIELD SETBACKS

- 125 feet where soil down gradient of leachfield is porous sand & gravel. — 125 ft
- 100 feet where soil maps indicate presence of soils with restrictive layers within 18 inches of natural soil surface. — 100 ft
- 75 feet where soil map indicates presence of all other soil types. — 75 ft
- 75 feet minimum setback from rivers.

PRIMARY BUILDING LINE*

- Primary buildings setback behind line. — 50 ft

REFERENCE LINE

- For coastal waters = highest observable tide line
- For rivers = ordinary high water mark
- For natural fresh water bodies = natural mean high water level
- For artificially impounded fresh water bodies = water line at full pond

* If a municipality establishes a shoreland setback for primary buildings, whether greater or lesser than 50 feet, that defines the Primary Building Line for that municipality.

APPENDIX C

RIVER RECREATION STUDIES

1. Rivers, Recreation, and the Regional Economy: A Report on the Economic Importance of Water-Based Recreation on the Upper Connecticut River

This study was conducted in 1996 by the National Wildlife Federation and North Country Council, with support from NH Dept. of Environmental Services, at the request of the Headwaters and Riverbend Subcommittees, who wished to know more about the role played in the economy of their towns by recreation associated with the Connecticut River. This information should also help local governments and the State of New Hampshire decide how to best manage this important natural resource.

Methods: A survey was conducted of 217 "water-dependent" businesses in New Hampshire along the river from the third Connecticut Lake to the Haverhill/Piermont town line. The response rate was 31%. (This study did not survey water-dependent businesses on the Vermont side of the river because the principle funding was from a New Hampshire source. Nevertheless, water-based recreation presumably has similar economic impacts for Vermont communities, as well.) Water-dependent businesses are those that provide goods and services related to water-based recreation, and includes all recreational activities conducted on or by the river, stream, lake, or pond, such as fishing, boating, and hiking, camping, and picnicking. Water-dependent businesses were targeted to investigate the relationship between environmental quality and economic health. A change in a river or lake's water quality has an effect on how and where recreationists spend their time and disposable income. Recipients of the survey were:

(1) businesses that are **directly** reliant on water-based recreation and tourism, including camps, campgrounds, guiding services, and retailers, such as sellers of bait, fishing gear, etc.

(2)businesses that are **indirectly** dependent on water resources include lodging establishments, restaurants, farm stands, and general stores, whose customers come because of their proximity to a recreational site.

Results: The section of the river by far most frequently used by the customers of the respondents was that in Pittsburg and Stewartstown (30%). The results of the survey show six principle messages:

- Water-based recreation in New Hampshire along the Upper Connecticut River is a $26 to $31 million business, creating at a minimum of 650 to 750 jobs;
- The business respondents strongly support improving fishing opportunities;
- The business respondents are in support of greater instream flow levels, especially for fish;
- The business respondents support public investment -- particularly for increasing access (specifically for fishing, swimming, canoeing, and kayaking), improving water quality, and for habitat management --and government involvement to protect the watershed, by both the state and local towns;
- The overwhelming interest of the business respondents to minimize environmental impacts associated with increased recreation indicate a need for a management framework to accompany tourism promotional efforts to educate tourists and businesses about sustainable recreational use; and,
- The business respondents are in favor of increases in marketing and advertising support.

Conclusions: The results demonstrate the economic value of clean water to area businesses, and its role in providing sustainable jobs and income in these rural communities along the Upper Connecticut River. Almost 70% of the business respondents agreed or strongly agreed that local governments should be involved in protecting the river. The stretch of the river most often used by their customers and likely the businesses most heavily patronized lie in Pittsburg, Clarksville, and Stewartstown. The results also show a need for a management strategy for any future tourism promotion of the river, including educating businesses and recreationists about sustainable recreational use.

2. Aerial Reconnaissance of Recreation on the Upper Connecticut River

This study was conducted by the CRJC in response to concerns of the Headwaters Subcommittee over a recent dramatic increase in recreational use, and possible effects upon the quality of the river and private property. Particular issues were over-fishing, property damage, illegal camping and improper access.

Methods: Since no data on river use existed other than some creel surveys, and much of the river is impossible to survey from the ground, it was decided to conduct a number of flights over the region counting boats, fishermen, campsites, and automobiles parked at access points. A portion of the Riverbend region was included, for a total of 71 miles of free-flowing river from Gilman Dam to Canaan Dam. Subcommittee members were invited to participate to see their river and observe other issues such as erosion and land use patterns. A total of eight flights were made and 11 people participated besides the pilot. Most flights took place during the early Saturday evening hours, since camping was the primary issue, and three flights were made mid-day. Observations were recorded on maps and later transferred to a master composite map so clusters and patterns could be identified.

Results: 1996 turned out to be a poor year for river recreation. Rain and cool weather kept use down through June and July. The VT Dept. of Forests and Parks reported a 40% decline in users of its facilities, and this same decline was probably true of river users. Usage patterns did clearly emerge, however. Colebrook appears to be the center of river recreation and is the home base for the largest known river tour operator. The Route 26 bridge and Arlins rest area on Route 3 are popular parking and access spots. Use of the river itself varied with the its character, which can be divided into roughly equal thirds. The 25.5 mile stretch from Canaan to Bloomfield/North Stratford features quick water and some Class II rapids, and is a well-known cold water fishery. Fishing pressure seemed heavy, with a total of 50 fishermen counted. 34 canoes were observed, and the highest number of parked cars. The only camping observed was at two sites on islands near the bottom of this stretch.

The 24 miles from Bloomfield/North Stratford to Guildhall/Northumberland include some quick water giving way to slow moving meanders and oxbows with sandy beaches. The quick water attracted fishermen, but only six were seen. Six campsites and 29 canoes were observed. Oxbows are frequently used for camping. There seems to be a commercial camping operation on an oxbow at mile 196.5, where up to 20 canoes were beached for the night at one time. Guildhall/Northumberland to Gilman/Dalton presented a different picture. Just as high use characterized the Colebrook region, low use characterized this one. The 21 river miles are slow moving, with fewer of the oxbows and beaches that attract campers. The fishing and canoeing are still excellent, yet only two fishermen and six canoes were observed. There was just one campsite, that on the property of an outfitter in Dalton.

Among the maintained and informal access points, those seeing the most use were in Canaan, where as many as five vehicles were parked at a time, and what may be an informal access just north of the Route 26 bridge in Vermont near Colebrook. Accesses at Bloomfield and Dalton often were empty. This contrasts with what the author of this study and local residents have observed in the past, and indicates the unusually low recreational use this summer. To get a broader picture of use and to share data with New England Power Company, two overflights of Moore and Comerford reservoirs took place. Our July 6th overflight of Moore occurred in the rain, and observed only two boats with wet fishermen. Our Labor Day Weekend flight saw six fishermen on shore, fifteen boats and one water skier on Moore, and eight boats and one water skier on Comerford.

Conclusions: This was a low use year, yet patterns are obvious. The highest use occurs in the narrowest, most sensitive portion of the river. Fishing pressures need to be closely monitored. With no formal campsites, camping may also become a problem. Commercial outfitters are discovering the river and entering into agreements with landowners. River recreation is of growing economic importance to Colebrook. The lowest portion of the surveyed river is under used. This survey should serve as a base line study so that future trends can be determined. "Capacity" itself, that is, the ability of the resource to withstand increasing pressure, might best be understood by examining three factors; the river itself, (water and fish) the users, (outfitters and vacationers), and residents.

Prepared by VT River Commissioner Nathaniel Tripp of Barnet, with thanks to pilot Alden Blanchard of Newport, VT

APPENDIX D

SELECTED BEST MANAGEMENT PRACTICES

Long experience with the water quality impacts of various kinds of land management has led the States of Vermont and New Hampshire to develop detailed guidance for landowners and towns in how to best manage land to minimize nonpoint pollution. Below is a general summary of selected practices for a variety of activities.

Each state has its own approach to these land management practices. For instance, spreading of manure in the winter, when it is likely to wash into streams because the frozen ground cannot absorb it, is highly discouraged by New Hampshire but prohibited between December 15 and April 1 by Vermont's rules for "acceptable agricultural practices." Contact the New Hampshire Dept. of Environmental Services or Vermont Agency of Natural Resources, or your county office of the Natural Resources Conservation Service, for information on the guidance or regulations which apply in your area (see Appendix G).

CONSTRUCTION SITES

Ensure good oversight of erosion and sedimentation control.

- provide erosion, sedimentation, and stormwater management plans
- use all natural resource information, including soils, topography, and geology

Minimize the amount of bare soil exposed.

- limit clearing on building sites and rights-of-way
- cluster buildings; build one phase at a time
- mulch all bare soil as soon as possible, before storms or rainfall
- stabilize, seed and mulch the area when soil will be exposed for an extended period

Minimize water-impervious surfaces that increase runoff.

- minimize the area of roofs, roads, sidewalks, and parking lots
- leave undisturbed as much of the site's natural vegetation as possible
- consider using porous pavement

Direct water away from construction areas.

- don't concentrate stormwater into channels
- redirect clean water that could otherwise drain onto the construction site
- schedule work during periods of low water, low rainfall, and when vegetation can best be established
- work with the natural contours of the site; use natural drainways (not man-made ones or streambeds)
- avoid building roads up and down steep slopes
- provide ditches and channels of sufficient stability and capacity to handle storm runoff velocities
- install ditch turnouts so that runoff flows into vegetated areas
- use natural ground cover (such as grass) on slopes and in drainage ditches
- use wet (retention) ponds to trap sediment and phosphorus
- ensure that storm and other drainage systems (not wastewater systems) empty into adequately sized channels and don't enter sewage systems

Protect existing stormwater inlets and culverts from sediment.

- mulch all bare soils
- install silt fencing and hay bale filters
- use sediment traps in larger ditches
- install a temporary, perforated riser at culverts

Make sure your erosion control measures are effective.

- adjust, maintain, and repair erosion controls after every storm event
- remove all temporary measures once construction has ceased and vegetation has taken root

DEVELOPED AREAS

Minimize pollutants washed into waterways from developed sites.

- use natural vegetation or new landscaping to act as a filter or buffer
- limit the amount of clearing
- divert runoff around sites where it could pick up pollutants
- keep parking areas, outdoor storage areas, and streets clean of debris
- maintain catch basins to prevent backup
- use grassed swales, constructed wetlands, detention ponds, wet ponds, and catch basins
- direct water away from unpaved road surfaces and keep runoff velocities low

TIMBER HARVESTING

Control erosion on exposed soils.

- construct water bars, turn-ups, and ditches on sloped trails and haul roads to divert runoff into the forest
- use appropriate method of wetland or water crossing for size of stream and traffic it must bear cross streams at right angles
- keep steep road pitches to a minimum and run skid trails at an angle to the slope
- size culverts properly; use on all truck road crossings of permanent streams
- maintain filter strips between logging operations and water bodies
- locate landings and roads on level or gently sloping ground, away from water bodies
- install water diversions at log landings to prevent sedimentation
- keep all slash away from streams and water bodies
- seed and mulch trails and exposed soils once operations are complete

AGRICULTURE, LAWNS, and GOLF COURSES

Keep fertilizers from fertilizing waterways.

- tailor the application of manure and fertilizer to the nutrient needs of the crop
- use soil tests to determine current nutrient levels and soil pH
- diversify crop rotations and plant cover crops after harvesting to use residual nutrients
- avoid spreading manure or fertilizer on frozen or snow covered ground
- incorporate manure into the soil as soon as possible after spreading
- do not store manure in the floodway or near wells
- maintain filter strips between surface waters and fields and feedlots
- control livestock access to water bodies
- divert runoff away from high animal use areas
- keep accurate fertilizer application and crop yield records
- manage milkhouse and parlor wash water
- store manure in properly constructed and located facilities

Control sedimentation and erosion.

- plant crops along contour lines
- rotate crops that provide limited ground cover with those that provide generous ground cover
- maintain filter strips between fields and surface waters
- plant cover crops or maintain residue cover on the fields after harvest
- construct and stabilize diversions to control runoff across cropland and control erosion in gullies
- keep livestock off bare streambanks
- set farm buildings back from streams

Use pesticides carefully.

- apply pesticides only when needed
- consider using integrated pest management to reduce pesticide use
- apply, store and handle pesticides properly
- obtain training in pesticide application or hire a licensed applicator
- do not spray or apply pesticides on windy days or before a heavy rain storm

ROAD SALTING AND SNOW STORAGE

It is illegal in both states to dump plowed snow directly into water bodies.

Keep salt, sand, and other pollutants in winter snow piles out of waterways.

- store disposed snow near flowing surface waters, but at least 25' from the high water mark, in order to dilute the salt with river water and avoid impacts to ground water, lakes, and wetlands; solid materials contained in the snow remain on the land surface and should be removed each spring
- avoid storing snow near water supply wells
- store salt piles under cover and on a flat, impervious surface so salt does not wash into the ground
- remove sand from streets in early spring

Apply road salt carefully.

- identify sensitive areas such as public water supplies and ponds, and consider de-icing alternatives
- give salt time to work; know when to plow and reapply salt
- determine salt application rates and frequency for all roads in a service area
- apply salt in a 4-8' wide center strip along lesser traveled roads
- use ground-speed controllers on spreaders

CHEMICAL AND PETROLEUM PRODUCTS

Keep these pollutants out of ground and surface waters.

- ensure that chemicals are recovered, recycled, or reused wherever possible
- have a spill prevention and response plan, with containment equipment readily available
- store containers and transfer chemicals only in areas that will contain spills, and away from waters, storm drains, and wells
- inspect regularly for leaks or potential contact with stormwater
- schedule routine cleanup operations
- do not allow floor drains and work sinks to discharge into or onto the ground

SEPTIC SYSTEMS

Keep the system working well to prevent groundwater pollution.

- know the location of septic tank and leach field; mark tank cover
- inspect tank frequently and pump it out at least every 3 years
- use water conservatively
- keep vehicles and livestock off the system
- do not use kitchen garbage disposal, which can clog the system
- do not pour caustic or toxic materials down the drain; these may kill necessary bacteria and contaminate sludge later intended for land application
- do not flush bulky items such as disposable diapers or sanitary pads into the system
- avoid putting food waste and grease into the system
- keep deep rooted trees and shrubs away from the leach field

Encourage local oversight.

- consider a town septic system education and inspection program
- consider adopting a local health ordinance for septic system regulation

DOCKS, MOORINGS, AND MARINAS

Ensure that new marinas are properly constructed to minimize water pollution.

- minimize the amount of paved, impervious surface
- limit use of pressure-treated lumber
- retain natural, vegetated buffers along the shore where possible
- provide erosion, sedimentation, and stormwater management plans

Prevent pollution from marina and boating activities.

- use only phosphate-free detergents and treat wash water before it enters the waterbody
- perform engine maintenance out of the water
- use propylene glycol as an antifreeze
- conduct painting and scraping where debris will not enter the water
- provide for spill containment
- install catch basins around boat launches to trap pollutants
- provide public restrooms and pumpout facilities to limit input of wastewater into water bodies
- use an on-board holding tank

Avoid introducing exotic species.

- remove plant fragments from boats and trailers
- wash boat and flush cooling system; leave boat out of water for 48 hours after boating in a contaminated waterbody

SAND AND GRAVEL EXCAVATION

Avoid pollution of nearby drinking water supplies and surface waters.

- investigate proposed pit areas during planning; allow space for mild pit slopes, diversions, and setbacks from abutters, water bodies, and drinking water supplies
- provide buffer strips of natural vegetation
- maintain 5 feet of unexcavated material above the seasonal high water table as a filter
- do not store petroleum products in the pit area
- develop spill prevention plan and clean up spills immediately
- maintain and wash equipment outside the pit area
- control dust to prevent nuisance and public hazard; use water rather than calcium chloride; never use oil
- use retention basins to trap fine material; clean out regularly
- use anti-tracking pads at gravel pit access roads to dislodge mud from tires

Reclaim excavations.

- leave surface soil which can sustain vegetation, and plant with grass or seedlings to prevent erosion
- grade slopes to at least the natural angle of repose
- restore original, natural drainage

BIOSOLIDS

Reduce risk of nutrient contamination of surface or subsurface water.

- do not store or apply biosolids near surface water or wells
- do not apply biosolids during time of high water table
- total available nitrogen should not exceed crop requirements

Reduce risk of contamination of feed crop lands.

- prioritize non-cropland or non-food crop lands for application
- for feed crop land, apply in fall before soil freezes or prior to planting
- avoid application where food crops are grown, especially leaf and root crops
- manage and monitor the land carefully

Apply and monitor carefully.

- select weather conditions when odors will dissipate quickly
- test soil nitrate levels annually
- calibrate equipment for uniform application rates
- avoid use of heavy equipment on wet soil
- do not apply on frozen, excessively wet, or snow-covered ground
- monitor the site and maintain at pH 6.5 long-term
- keep good crop records on individual fields

◆

PUBLICATIONS

NEW HAMPSHIRE

- *Best Management Practices to Control Nonpoint Source Pollution: A Guide for Citizens and Town Officials*, NH Dept. of Environmental Services, 1994.
- *Best Management Practices for Urban Stormwater Runoff*, NH Dept. of Environmental Services, 1996
- *Stormwater Management / Erosion and Sedimentation Control Handbook for Urban and Developing Areas in New Hampshire*, NH Dept. of Environmental Services, 1992
- *Best Management Wetland Practices for Agriculture*, NH Dept. of Agriculture
- *New Hampshire's Manual of Best Management Practices for Agriculture*, NH Dept. of Agriculture, 1993
- *Resource Manual: Best Management Practices for Erosion Control on Timber Harvesting Operations in New Hampshire*, NH Division of Forests and Lands, 1991.
- *Best Management Practices: Biosolids*, UNH Cooperative Extension, 1995

VERMONT

- *Vermont Agricultural Nonpoint Source Pollution Reduction Program Law and Regulations*, VT Dept. of Agriculture, Food and Markets, 1996
- *Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont*, VT Dept. of Forests, Parks, and Recreation, 1987
- *Vermont Handbook for Soil Erosion and Sedimentation Control on Construction Sites*, VT Agency of Natural Resources, 1982
- *Vermont Streambank Conservation Manual*, VT Agency of Natural Resources, 1987
- *Vermont Better Backroads Manual*, George D. Aiken/Northern VT Resource Conservation & Development Councils, 1995
- Wetland Fact Sheets: "Erosion Control," "Agricultural Activities in Wetlands," "Stormwater and Wetlands," VT Dept. of Environmental Conservation, 1992
- "Road Salt and Salted Sand Storage Guidelines," Dept. of Environmental Conservation, 1993

CONNECTICUT RIVER JOINT COMMISSIONS

- *The Challenge of Erosion in the Connecticut River Watershed*, 1996
- *The Watershed Guide to Cleaner Rivers, Lakes, and Streams*, 1995
- *A Homeowner's Guide to Controlling Nonpoint Source Pollution in the Connecticut River Valley*, 1994

APPENDIX E

FOREST PRINCIPLES AND GUIDELINES

American Forest & Paper Association

The American Forest and Paper Association developed these principles and guidelines as part of its Sustainable Forestry Initiative, and since January, 1996, has required compliance as a condition of membership. The Headwaters Subcommittee endorses these guidelines and encourages their use by private forest landowners in the region.

DEFINITION OF SUSTAINABLE FORESTRY: Managing our forests to meet the needs of the present without compromising the ability of future generations to meet their own needs by practicing a land stewardship ethic which integrates the growing, nurturing, and harvesting of trees for useful products with the conservation of soil, air and water quality, and wildlife and fish habitat.

FOREST PRINCIPLES

1. Meet the needs of the present without compromising the ability of future generations to use the forest for products as well as for ecological and other uses.
2. Promote both environmentally and economically responsible practices on AF&PA members' and all other forest lands.
3. Improve long-term forest health and productivity by protecting forests against wildfire, pests, and diseases.
4. Manage forests of biological, geological, or historical significance to protect their special qualities.
5. Continuously improve forest management and regularly track progress toward achieving the goal of sustainable forestry.

IMPLEMENTATION GUIDELINES (compliance required for member companies):

1. Broaden the practice of sustainable forestry
   - require members of AFPA to develop specific programs, plans, and policies to achieve sustainability
   - support research
2. Ensure prompt reforestation within a specified time following harvest
3. Protect water quality
   - meet or exceed all existing government standards
   - protect all perennial lakes and streams
   - involve independent experts to improve existing programs; support research
4. Enhance wildlife habitat
   - develop specific programs, policies, and plans to promote habitat diversity; support research
5. Minimize the visual impact of harvesting
   - develop specific programs and policies
   - control clearcut sizes
   - comply with "green up" requirements before harvesting adjacent areas
6. Protect special sites
   - identify and manage them appropriately
   - involve independent experts as appropriate
7. Contribute to biodiversity
   - support biodiversity research
   - employ adaptive management techniques
8. Continue to improve wood utilization; employ appropriate technology
9. Continue the prudent use of forest chemicals to ensure forest health
   - meet or exceed legal requirements
10. Foster the practice of sustainable forestry on all forest lands
    - inform other woodland owners about the benefits of reforestation
    - promote the establishment of training programs for loggers
    - support and promote other landowner education efforts
11. Publicly report progress
12. Provide opportunities for public outreach

APPENDIX F

PRESENT TOWN REGULATIONS REGARDING THE RIVER

NEW HAMPSHIRE TOWNS

Tools	Lancaster	Dalton	Littleton	Monroe	Bath	Haverhill	Haverhill Corner
Master Plan	yes*	yes*	yes*	yes*	yes*	yes*	yes*
Zoning Ordinance	yes	none	yes* 125' setback from streams for new leach fields on excessively drained soils; cluster single-family; erosion control, devel. compatible with natural features	yes	yes* no development in flood hazard area; steep slope and aquifer conservation area 200' setback from water supply	none	yes* lists prohibited uses in flood prone areas
Subdivision Regulations	yes	yes* storm-water drainage; ground-water protection	yes* require subdivider to preserve existing views, water bodies	yes* erosion/sed. controls; protect natural features, avoid subdivision of flood-prone areas	yes* preserve/protect prominent natural features to max extent possible	yes* lot size based on soil capacity; erosion/ sed. control	yes* avoid subdivision of land subject to periodic flooding or poor drainage
Excavation Regulations	yes	yes	none	none	none	none	none
Nat'l Flood Ins.Prog.	yes	yes	yes	no	yes	yes	no
Wetlands Regulations	none	none	none	none	yes	yes	none
Shoreland Protection	none	none	none	none	none	none	none

*addresses water quality

prepared with the assistance of North Country Council & support from NH Dept. of Environmental Services

VERMONT TOWNS

Town tools	Guildhall	Lunen burg	Concord	Waterford	Barnet	Ryegate	Newbury
Master Plan	yes*	none	yes*	yes	yes*	yes*	yes
Zoning Ordinance	yes*	none	yes*	yes	yes*	yes*	yes
Subdivision Regulations	none	none	none	yes	none	none	yes
Excavation Regulations	none	none	none	none	none	none	none
National Flood Insurance Program	yes	yes	yes	yes	yes	yes	yes
Wetlands regulations beyond state level	none	none	none	none	none	none	none
Shoreland Protection	75' setback from streams	none	apply only to Shadow Lake and Miles Pond, require 150' septic setback, building setback 35'; frontage 150'; no vegetation protection, limited uses	none	500' overlay district: both streams and lakes ex. in village district: 500' setback for junkyards /dumps; 200' setback non-residential uses; 100' setback ex. shore uses; no vegetation preservation required	100' building setback; 50' septic setback; 200' frontage; conditional use only	buffer requirement for waterbodies; 750' shoreland district 100' building setback; 30' height restriction within district

*addresses water quality

prepared with the assistance of Northeast Vermont Development Association and Two Rivers Ottauquechee Regional Planning Commission

APPENDIX G

TOOLS FOR PROTECTING RIVERFRONT LANDS & WATER QUALITY

STATE STATUTES

NEW HAMPSHIRE

NH's Comprehensive Shoreland Protection Act (RSA 483-B) sets minimum shoreland protection standards for shore lands along New Hampshire's great ponds, rivers, artificial impoundments and coastal waters. These standards are designed to minimize shoreland disturbance in order to protect the public waters, while still accommodating reasonable levels of development in the protected shoreland. Although the act sets minimum standards, section 483-B:8 gives municipalities the authority to adopt land use control ordinances which are more stringent. This section also encourages communities to adopt ordinances to protect non-public waters. The Connecticut River, having been designated into the NH Rivers Management and Protection Program prior to 1993, is exempt from the statute. However, towns along the river have the opportunity to examine their sections of the river and in those sections where it is appropriate, recommend stronger controls than those set forth in the legislation.

VERMONT

Section 1422 of Title 10 of the Vermont Statutes gives towns the authority to regulate shore lands to prevent and control water pollution; preserve and protect wetlands and other terrestrial and aquatic wildlife habitat; conserve the scenic beauty of shore lands; minimize shoreland erosion; reserve public access to public waters; and achieve other municipal, regional or state shoreland conservation and development objectives. Other state regulations set standards for management of agricultural land, silvicultural practices, and sediment and erosion control. In-stream water quality continues to be directly regulated at the state level, including withdrawals and discharges from and into surface waters.

◆

LOCAL TOOLS

Besides the state statutes, many tools are available to communities and individuals to protect water quality; some are of a regulatory nature, some are non-regulatory. Local tools can include adopting a master plan (town plan) and/or water resources management plan with strong recommendations for protecting water quality, scenic views, agricultural soils, riparian buffers, prime wetlands, floodplains, open space, and wildlife habitat. These recommendations could then be carried through to regulatory documents such as zoning, subdivision and site plan review.

LOCAL REGULATORY MEASURES

Floodplain Ordinances

Floodplain ordinances can prohibit construction in the floodplain. Floodplains provide flood storage, wildlife habitat and essentially act as buffers to protect water quality. Construction, development, or filling in of floodplains removes flood storage and displaces floodwater to locations further downstream. There is the added benefit of protecting buildings from flood damage which costs taxpayers millions of dollars each year.

Shoreland Overlays

A community could also adopt a shoreland protection ordinance or a buffer overlay to the zoning ordinance in which protection measures for surface waters can be more closely defined than for the rest of the town. In both states the requirements of the shoreland ordinance supersede that of the underlying zoning ordinance. In 1994 the New Hampshire Office of State Planning updated its model shoreland protection ordinance to be consistent with the requirement of NH's Comprehensive Shoreland Protection Act.

Others

- separation of storm water and wastewater in municipalities with combined sewer overflows;
- confinement of the amount of impervious surface created by new development to reduce the transportation of sediments and nutrients
- use of sediment and erosion control measures during and after construction

LOCAL NON-REGULATORY METHODS

Vegetated Buffers

The use of riparian buffers can be either regulatory or voluntary, and is one of the best and most commonly used methods of protecting surface water. This strip of natural or planted vegetation along the riverbank can intercept harmful nutrients, toxic chemicals and sediments before they enter the surface waters, and control bank erosion. Vegetated buffers are relatively inexpensive and have the added advantage of providing habitat for both land based and aquatic animal species and privacy for landowners. Shading streams with vegetation helps to optimize light and temperature conditions critical to the survival of certain species, such as trout. Naturally vegetated buffers promote high biological productivity and diversity.

Conservation Easements

- purchase or donation of development rights
- acquisition of land or rights of way

Towns or conservation groups can use these tools to provide a buffer on land adjacent to surface waters and wetlands, to protect water quality and provide public access without creating new regulations. Prime agricultural soils, sites for rare and endangered species, and historic and archaeological sites can be protected in the same manner.

Incentives

- current use assessment program
- encourage farmers to use the established and extensive resources of the State Department of Agriculture and the Natural Resources Conservation Service (NRCS) to develop and implement a land management plan which incorporates the use of best management practices

Education programs

Education programs through schools and non-profit education and land use organizations can increase the awareness of the general public regarding private property rights and ways to control nonpoint pollution on private land. Programs should emphasize the locations and use of existing public access and asking permission before stepping on private property.

APPENDIX H

CONSERVATION EASEMENTS

Land trusts offer a voluntary mechanism for protecting individual parcels of land forever. Using a legal document known as a conservation easement, land trusts can ensure continued stewardship and productive use without relying on public regulation or public ownership.

Land subject to conservation easements remains in private ownership and can be sold, given or transferred at any time. A conservation easement assures the landowner that the resource values of his or her property will be protected forever, no matter who the future owners are.

What is a conservation easement?

A conservation easement is a legally enforceable agreement between a landowner and a private conservation organization (such as a land trust) or governmental agency that specifies forever, the types and locations of activities permitted on a particular parcel of land. A conservation easement is a deed "running with the land," and all future landowners are bound to the provisions of the easement deed.

Landowners place conservation easements on their properties voluntarily, working with land trusts to craft provisions that will protect the natural features of the property and meet the landowner's objectives. For instance, a landowner may choose to conserve some, but not all, of her land; or a landowner may wish to specify timber or habitat management standards to continue his investment in good stewardship.

Conservation easements are usually donated to land trust, but in certain cases, land trusts may purchase conservation easements. This is sometimes called "selling development rights."

Conserved land remains in private ownership, used for farming, forestry and other activities that are consistent with the purposes of the conservation easement deed. The land trust accepts the responsibility of monitoring the property - forever - to ensure compliance with the terms of the conservation easement.

Does a conservation easement allow public access to the property?

Landowners who grant conservation easements make their own choice about whether to open their property to the public. A conservation easement does not allow access to the general public unless the landowner has specifically provided for access in the easement agreement.

Public access is more often granted when the property has a history of public use and is perceived to be a recreational resource. Some landowners provide public access rights to a limited area, such as allowing fishing in designated areas or hiking along a clearly defined corridor. Landowners may choose to permit public access for specific purposes (scientific research, education, or hunting, for example). Some landowners restrict public access to particular types of activities, such as walking, skiing, biking, or horseback riding.

Conservation easements do permit regular access by the land trust for the purpose of monitoring the use and activities on the property to ensure that the terms and conditions of the conservation easement are upheld.

Who can grant an easement?

Any owner of property with conservation values may grant a conservation easements. If the property belongs to more than one person, all owners must consent to granting an easement. If the property is mortgaged, the owner must obtain an agreement from the lender to subordinate its interests so that the easement cannot be extinguished in the event of foreclosure.

How restrictive is a conservation easement?

A conservation easement generally permits existing land use practices to continue and may allow a limited amount of future development. Each easement is designed to prohibit development and other activities to the degree necessary to protect the significant natural values of that particular property.

Agricultural and forestry activities are permitted and encouraged on most easement-protected land. This includes: building structures such as culverts, bridges, barns, sheds, fences and dams when necessary for farming and forestry. Habitat management and improvement, such as creating ponds and wetlands or establishing plant species to benefit wildlife, is also usually permitted.

Depending on the characteristics of the property and the landowners' wishes, future residential or commercial construction may be prohibited entirely or limited to sites where the impact will not impair the natural values of the property. Additional limitations may include prohibition of mining, excavation, or installation of billboards, and the establishment of protective buffers around ponds or waterways.

How much land must be included?

Any amount. A conservation easement may apply to only a small part or all of an owner's land, depending upon what the owner wants to protect and on whether the restrictions are acceptable to the land trust.

Are there financial benefits to donating a conservation easement?

Income Taxes: The donation of a conservation easement constitutes a charitable gift which may be deductible for federal income tax purposes if the property meets conservation standards established by the federal government. The value of the gift, determined by an appraisal, is equal to the difference between the fair market value of the property before and after the easement is donated.

Estate Taxes: A conservation easement can be a useful estate planning tool, enabling heirs to keep land they would otherwise have to sell. State and federal inheritance taxes on real estate are often so high that the heirs are forced to sell some or all of the land just to pay the taxes. Because an easement reduces the value of the property, the inheritance taxes are also reduced.

Gift Taxes: When a landowner gives land to a family member, the gift is subject to gift taxes if its value exceeds the maximum tax-free amount. Lowering the value of the land through a conservation easement may allow the landowner to give more land free of tax, or may help reduce the amount of tax owed.

Property Taxes: Most property subject to a conservation easement is eligible for preferential tax treatment under current use taxation. Landowners whose property is already enrolled in a current use program will generally not see a further reduction in their property taxes.

How are conservation easements enforced?

The recipient organization (usually a land trust) is responsible for monitoring compliance in perpetuity. Representatives of that organization will visit the property periodically to determine that no violations have occurred. The organization will use written records and photographs to document the condition of the property.

A property owner should make sure that the recipient organization has the time and resources to carry out its monitoring responsibility. Most land trusts maintain endowments for this purpose, and many ask the landowner to make a contribution to the endowment at the time an easement is accepted.

Prepared with the assistance of the Upper Valley Land Trust, which was founded in 1985 with a mission of helping people conserve land. UVLT has worked with farmers and forest owners, local conservationists, and elected officials to conserve nearly 12,000 acres of land since then: productive farmland, working forest, remote wild places, stream and river corridors, scenic vistas, wetlands, biking trails, and picnic and camping spots. The Upper Valley Land Trust works in 40 Upper Valley towns on both sides of the Connecticut River. For more information about how you can conserve your land, or a special place in your community, call or write:
UVLT, 19 Buck Rd, Hanover, New Hampshire 03755 (603) 643-6626.

APPENDIX I

GUIDE TO PERMITS

GET THE RIGHT PERMITS FOR PROJECTS NEAR RIVERS AND STREAMS

Any work you do near a river or stream can affect other landowners and public values such as water quality, fish, wildlife, and flood control. To protect the public's interests, federal, state and local governments have developed laws, rules, and ordinances for projects in or near rivers and streams. Permits and approvals are necessary for streambank stabilization, construction, and other earth disturbances on the bank or in the bed of a stream. It is important that the necessary approvals and permits are obtained before any work is begun. Penalties exist for unauthorized work.

LOCAL CITY OR TOWN

Contact: Selectmen's Office/Town Manager/Zoning Administrator

Provides Information About: Local Zoning Regulations and/or Federal Emergency Management Agency (FEMA) regulations for work in the floodplain and wetland protection.

STATE OF NEW HAMPSHIRE

All projects in New Hampshire must be reviewed by the NH Wetlands Board, which has been charged by the legislature with protecting the State's submerged lands and wetlands from despoliation and unregulated alteration (RSA 482-A). A wetlands permit is required to excavate, remove dredge, fill, or build a structure in or on the bank of any surface waters or wetlands in the state. Surface waters include lakes, rivers, brooks and perennial or seasonal streams, but exclude sheet runoff in the absence of a defined channel or wetland vegetation. Projects that significantly expose raw earth may require an Alteration of Terrain permit.

I. Wetlands Permit

A. *Obtain Application* from your Town Clerk or Wetlands Bureau

B. *Primary Permit Requirements are explained in:* NHDES fact sheet, "Wetland Permits for Bank Stabilization" (Technical Bulletin #WRD-1991-5)

C. *Contact for Information:* Wetlands Bureau, NH Dept. of Environmental Services, 6 Hazen Drive, P.O. Box 95, Concord, NH 03301 • Phone: (603) 271-2147 -- Fax: (603) 271-6588

D. *Fee Schedule:* Minimum filing fee of $50 for all Minimum Impact Projects. Additional filing fee may be required for Minor or Major Projects at $ .025/square foot of requested jurisdictional area impact.

E. *Other Considerations:* Contact Rivers Coordinator at NHDES • Phone (603)271-1152

1. *New Hampshire Rivers Management and Protection Act (RSA 483):* Projects on the Connecticut River and others designated under this program must meet the requirements of the law. Copies of all permit applications needing NHDES approval are also reviewed by the Rivers Coordinator and the local river management advisory committee. (Technical Bulletin NHDES-CO-95-2)

2. *Comprehensive Shoreland Protection Act, (RSA 483-B):* Projects located on fourth order or higher rivers, except the Connecticut River and others designated for protection under RSA 483 prior to January 1, 1993, must comply with the minimum standards of this law which are usually added as a condition of the Wetlands Permit. Phone: (603)271-6876.

II. Alteration of Terrain Permit

A. *Obtain Permit Application and Information* from: Water Supply & Pollution Control Division (WSPCD), NH Dept. of Environmental Services, 6 Hazen Drive, P.O. Box 95, Concord, NH 03302-0095 • Phone: (603) 271-3503 Fax: (603) 271-2867

B. *Primary Requirements for Permit:* Projects with significant alteration of 100,000 sq. ft. or more. Projects with significant alteration of 50,000 sq. ft. or more on rivers which fall under the jurisdiction of the Comprehensive Shoreland Protection Act (see above).

C. *Fee Schedule:* 50,000 - 199,000 sq. ft of disturbance requires a fee of $100. Add $100 for each additional 100,000 sq. ft thereafter.

D. *Other Considerations: New Hampshire Rivers Management and Protection Act:* (see above)

III. Federal Clean Water Act Section 404 Permit and Section 401 Water Quality Certification
New Hampshire implements a State Program General Permit (NHSPGP) through the U.S. Army Corps of Engineers for activities involving dredge or fill in waters of the state and work affecting navigable waters. The NHSPGP excludes certain activities and is generally limited to minor or controversial activities. Projects which require a Section 404 permit from the Corps must also obtain a Section 401 Water Quality Certificate from NHDES-WSPCD.

A. *Contact for Information:* U.S. Army Corps of Engineers, Regulatory Division for Permits in NH, 424 Trapelo Rd., Waltham, MA 02254-9149 • Phone: (800)343-4789 – Fax: (617)647-8303

B. *Obtain Water Quality Certificate and Information from:* Surface Water Quality Bureau, Water Supply & Pollution Control Division, NH Dept. of Environmental Services, 64 North Main St., Concord, NH 03301 Phone: (603) 271-2457 Fax: (603) 271-7894

C. *Project Types:*
Minimum Impact Project: work can proceed following receipt of Wetlands permit (see above)
Minor Impact Project: work must wait 30 days after Wetlands Board approval for reply from Army Corps
Major Impact Project: work cannot proceed until after Wetlands Board approval and until Army Corps sends written confirmation that the project has been approved.

STATE OF VERMONT

The Vermont Stream Alteration Law, Title 10, Chapter 41, requires that all stream alteration projects which seek "to change, alter or modify the course, current or cross-section of any water course having a drainage area greater than 10 square miles by movement, fill or by excavation of 10 cubic yards or more of material," require a permit from the Stream Alteration Engineers of the VT Agency of Natural Resources.

I. Stream Alteration Permit

A. *Obtain permit application and information from:* (For projects located on the Ompompanoosuc River and north AND the Winooski River and north): VT Agency of Natural Resources, 184 Portland Street, St. Johnsbury, VT 05819 • Phone: (802) 748-8787 Fax: (802) 748-6687
(For projects on the White River and south AND Lewis Creek and south): VT Agency of Natural Resources, 450 Asa Bloomer Bldg, Rutland, VT 05701-5903 • Phone: (802) 786-5906 Fax: (802) 786-5915

B. *Fee Schedule:* $100 per permit

II. Federal Clean Water Act Section 404 Permit and Section 401 Water Quality Certification
Water Quality Certification is required for all projects regarding discharge and dredged or fill materials in waters of the U.S., regardless of the size of the watershed. Contacts are same as for stream alteration permits, above.

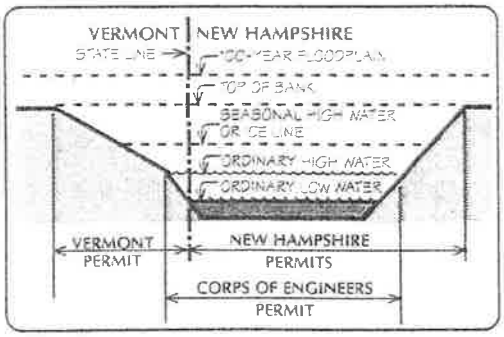
III. Wetlands Permit
If the proposed project is located in or near a wetland, a site visit may be necessary. Impacts may be addressed under Title 10 VSA, Chapter 37, Section 905(a), 401 Water Quality Certification and Act 250.

A. *Obtain permit application and information from:* Wetlands Coordinator, Water Quality Division, VT Agency of Natural Resources, Building 10N, 103 So. Main St., Waterbury, VT 05671 • (802) 241-3770

IV. Connecticut River Projects
The Ordinary Low Water mark (OLW) is the New Hampshire/Vermont state line. By agreement with the VT Agency of Natural Resources, permit applications involving the Connecticut River are reviewed by the local river management advisory subcommittee.

A. *For projects on the Vermont side of the Connecticut River riverward of the Ordinary Low Water mark*, contact NHDES to see if additional permits are required at: Wetlands Bureau, NH Dept. of Environmental Services, 6 Hazen Drive, P.O. Box 95, Concord, NH 03301 • Phone: (603) 271-2147 Fax: (603) 271-6588

B. *For projects on the Connecticut River landward of the Ordinary Low Water mark*, contact the U.S. Army Corps of Engineers for information about jurisdiction and application procedures at: U.S. Army Corps of Engineers, Regulatory Division, Camp Johnson, Bldg 10-18, Colchester, VT 05446 • Phone: (802) 655-0334 Fax (802) 655-0818



APPENDIX J

SOURCES OF ASSISTANCE

FEDERAL AGENCIES

Environmental Protection Agency
Region 1
JFK Building
Boston, MA 02203
617-565-9026

USDA Natural Resources Conservation Service
- NH county offices:
  Coos County: 788-4651
  Grafton County: 747-2001
  Sullivan County: 863-4297
  Cheshire County: 352-3602
- VT county offices:
  Essex/Caledonia Counties: 748-3885
  Orange/Windsor Counties: 295-1504
  Windham County: 254-5323

USDA Cooperative Extension Service
- NH county offices:
  Coos County: 788-4961
  Grafton County: 747-6944
  Sullivan County: 863-9200
  Cheshire County: 352-4550
- VT county offices:
  Essex/Caledonia Counties: 676-3900
  Orange/Windsor Counties: 296-7630
  Windham County: 257-7967

New England Interstate Water Pollution Control Commission
255 Ballardvale St.
Wilmington, MA 01887
508-658-0500

National Park Service
Rivers and Trails Conservation Assistance Program NH/VT
King Farm, 5 Thomas Hill
Woodstock, VT 05091
802-457-4323

U.S. Fish and Wildlife Service
Conte Refuge Planning Project
38 Avenue A
Turners Falls, MA 01376
413-863-3070

NEW HAMPSHIRE STATE AGENCIES

Dept. of Environmental Services
6 Hazen Dr., P.O. Box 95
Concord, NH 03302-0095
603-271-3503
- Rivers Coordinator: 271-1152
- Water Division: 271-3503
- Wetlands Bureau: 271-2147

Fish and Game Department
2 Hazen Dr.
Concord, NH 03301
603-271-3211

Dept. of Resources & Economic Development
172 Pembroke Rd., P.O. Box 1856
Concord, NH 03302-1856
603-271-2411
- Natural Heritage Inventory: 271-3623

Division of Historical Resources
19 Pillsbury St., P.O. Box 2043
Concord, NH 03302-2043
603-271-3558

Department of Agriculture
25 Capitol St., 2d Floor
P.O. Box 2042
Concord, NH 03302-2042
603-271-3551

Department of Safety
31 Dock Rd.
Gilford, NH 03246
603-293-0091

VERMONT STATE AGENCIES

Dept. of Agriculture, Food, & Markets
116 State St.
Montpelier, VT 05620-2901
802-828-2500

Agency of Natural Resources
Dept. of Environmental Conservation
103 S. Main St., 1 South
Waterbury, VT 05671-0401
802-241-3800
- Water Supply: 241-3400
- Water Quality: 241-3770
- Solid Waste Management: 241-3444

Dept. of Fish & Wildlife
103 S. Main St., 10 South
Waterbury, VT 05671-0501
802-241-3700
- Natural Heritage Inventory Program:241-3700

Dept. of Forests, Parks & Recreation
103 S. Main St., 10 South
Waterbury, VT 05671-0601
802-241-3670

Department of Travel & Tourism
134 State St.
Montpelier, VT 05602-3403
802-828-3237

Division for Historic Preservation
135 State St., 4th Floor, Drawer 33
Montpelier, VT 05633-1201
802-828-3226

Housing &Conservation Board
136 ½ Main St., Drawer 20
Montpelier, VT 05620-3501
802-828-3250

Water Resources Board
58 E. State St. Drawer 20
Montpelier, VT 05620-3201
802-828-2871

REGIONAL PLANNING COMMISSIONS
and Resource Conservation and Development Areas

Northeast Vermont
Development Association
P.O. Box 640
St. Johnsbury, VT 05819
802-748-5181

North Country Council
107 Glessner Rd.
Bethlehem, NH 03574
603-444-6303

Upper Valley/Lake Sunapee RPC
77 Bank St.
Lebanon, NH 03766-1704
603-448-1680

Southwest RPC
20 Central Square, 2d Floor
Keene, NH 03431
603-357-0557

Two Rivers/Ottauquechee RPC
King Farm, 5 Thomas Hill
Woodstock, VT 05091
802-457-3188

Southern Windsor County RPC
Box 320 Ascutney Prof. Bldg., Route 5
Ascutney, VT 05030
802-674-9201

Windham Regional Commission
139 Main St., #505
Brattleboro, VT 05301
802-257-4547

George D. Aiken Resource
Conservation & Development Area
P.O. Box 411
Randolph, VT 05060
802-728-9526

North Country Resource
Conservation & Development Area
103 Main St., Suite 1
Meredith, NH 03253
603-279-6546

PRIVATE ORGANIZATIONS AND LAND TRUSTS

River Watch Network
New England Office
RR 1, Box 209
Hartland, VT 05048
802-436-2544

Connecticut River Watershed
Council
1 Ferry St.
Easthampton, MA 01027
413-529-9500

NH Rivers Council
54 Portsmouth St.
Concord, NH 03301
603-228-6472

Vermont River Conservancy
RR 5, Box 920
Montpelier, VT 05602
802-229-9282

The Nature Conservancy- NH
2 ½ Beacon St., Suite 6
Concord, NH 03301
603-224-5853

The Nature Conservancy-VT
27 State St.
Montpelier, VT 05602
802-229-4425

Vermont Natural Resources
Council
9 Bailey Ave.
Montpelier, VT 05602
802-223-2328

Audubon Society of NH
3 Silk Farm Rd.
Concord, NH 03301
603-224-9909

Society for Protection of NH
Forests
54 Portsmouth St.
Concord, NH 03301
603-224-9945

Upper Valley Land Trust
19 Buck Rd.
Hanover, NH 03755
603-643-6626

Vermont Land Trust
8 Bailey Ave.
Montpelier, VT 05602
802-223-5234

Passumpsic Valley Land Trust
P.O. Box 124
St. Johnsbury, VT 05819
802-748-8089

Windmill Hill Pinnacle Association
RR 3 Box 248
Putney, VT 05346

Inherit New Hampshire
266 N. Main St.
Concord, NH 03301
603-224-2281

Vermont Institute of Natural
Science
Church Hill Rd.
Woodstock, VT 05091
802-457-2779

Montshire Museum
P.O. Box 770
Norwich, VT 05055
802-649-2200

Bonnyvale Environmental Center
Old Guilford Road
Brattleboro, VT 05301
802-257-5785

NH Farm Bureau
295 Sheep Davis Rd.
Concord, NH 03301
603-224-1934

VT Farm Bureau
RR 4, Box 2287
Montpelier, VT 05602
802-223-3636

APPENDIX K

MEMBERS OF THE RIVERBEND SUBCOMMITTEE

past and present

William Allin, Lancaster, NH
Moriah Bessenger, Lancaster, NH
Philip Blanchard, Monroe, NH
David Blanchette, Lunenburg, VT
Ken Cantin, Lunenburg, VT
Jon Carpenter, Barnet, VT
Laurie Carr, Lancaster, NH
Pauline Corzilius, Haverhill, NH
◆ Vern Dingman, Haverhill, NH
◆ Chester Eaton, Lunenburg, VT
◆ Keith Eddy, Waterford, VT
Bill Elder, Ryegate, VT
Hugh Elder, Ryegate, VT
Janine Elliott, Lancaster, NH
Scott Forbes, Lancaster, NH
Roger Gingue, Lancaster, NH
Dennis Goodwin, Waterford, VT
Craig Hervey, Newbury, VT
Harry Lackie, Bath, NH
Lantagne, Mary Anne, Barnet, VT
Dale Lewis, Haverhill, NH
◆ Richard Martin, Guildhall, VT
Charles Metz, Newbury, VT
Donald Mooney, Dalton, NH
Nancy Mooney, Dalton, NH
◆ Peter Poulsen, Littleton, NH
Leighton Pratt, Lancaster, NH
◆ Carl Schaller, Littleton, NH
Albert Sponheimer, Ryegate, VT
Peter Stanton, Monroe, NH
Dean Sweeney, Dalton, NH
Judy Tumosa, Bath, NH
Rodney Zwick, Barnet, VT

◆ *indicates elected officers of the subcommittee*