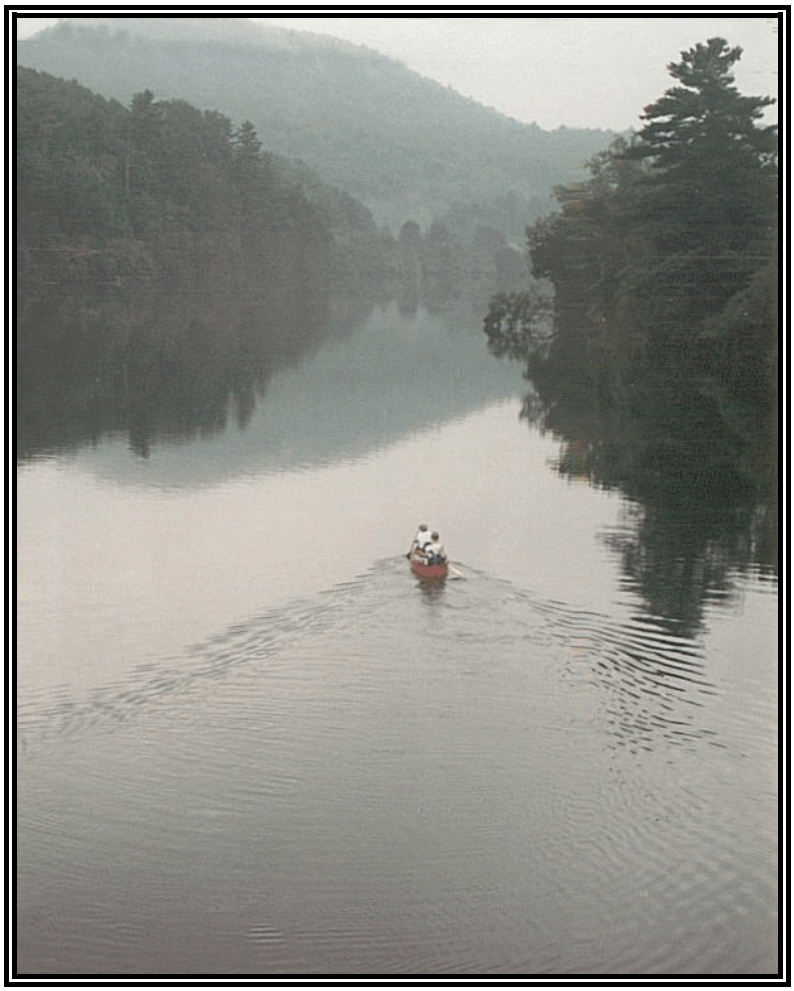
RECREATION
Upper Valley Region



Connecticut River Management Plan

CONNECTICUT RIVER JOINT COMMISSIONS INC

2008

RECREATION
Upper Valley Subcommittee
adopted May 19, 2008

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Cover image: The Connecticut River,
looking downstream from the bridge joining
Lyme, New Hampshire and Thetford, Vermont

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PREFACE

A Citizen-based Plan for the Connecticut River

The Upper Valley Region's plan is a blueprint for stewardship of the Connecticut River – for communities, landowners, visitors, businesses, and agencies on both shores. Gathering together to create this plan for the Upper Valley segment of the river were representatives from the towns of Piermont, Orford, Lyme, Hanover, and Lebanon, New Hampshire and Bradford, Fairlee, Thetford, Norwich, and Hartford, Vermont.

The strength of the Upper Valley 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. All of the recommendations of the Upper Valley Subcommittee's plan represent the consensus of this diverse group of citizens.

Origin of the Connecticut River Management Plan

The Connecticut River Joint Commissions (CRJC) mobilized hundreds of valley residents and local officials to join them in nominating the Connecticut River into the New Hampshire Rivers Management and Protection Program in 1991-2. The New Hampshire Legislature subsequently designated the river for state protection under RSA 483, which authorized CRJC to develop a river corridor management plan. CRJC sought support from the Vermont Legislature as well, so citizens from both states could engage in planning for their shared river.

With backing from both legislatures, CRJC contacted select boards or city councils from the 53 New Hampshire and Vermont riverfront communities and asked them to nominate representatives to serve on five bi-state local river subcommittees. This partnership between local town representatives and the state commissions for the Connecticut River enabled CRJC to publish the first edition of the *Connecticut River Corridor Management Plan* in 1997, after five years of work by the Commissions and the five bi-state local river subcommittees. Since this planning process began in 1993, nearly 200 citizens have thus participated in the subcommittees' work. A summary of progress on the plan's recommendations for recreation appears in Appendix B.

A New Recreation Plan

Increasing attention to public recreation in the region, including the development of the Upper Valley Trails Alliance, prompted CRJC to ask the local river subcommittees to update and expand the 1997 Recreation chapter of the *Connecticut River Corridor Management Plan*. The Subcommittees have explored new topics, especially in land-based-recreation, in an attempt to portray and address the full range of recreation issues in the region.

Plan Process

The Upper Valley Subcommittee met at the Thetford Bicentennial Building throughout 2004 and 2005 to develop the new recreation chapter for this section of the river. CRJC's Conservation Director, who manages the five subcommittees' communications with each other, CRJC, and state agencies and organizations, transcribed the subcommittee's discussions to construct drafts of the plan, which the members revised and approved. Final updates were included before the plan was approved in 2008.

Scope of the plan

The Subcommittee has concentrated its planning upon the towns that border 39 miles of the Connecticut River in this segment. Recommendations are presented within each topic area, and are summarized in Appendix A, arranged by responsible party. Some are aimed beyond town boundaries, to guide state and federal agencies. The Subcommittee recognizes that proper care of the river is such a large task and important public duty that help from beyond the watershed is sometimes appropriate and needed from those agencies which share responsibility for the river.

The Connecticut River Joint Commissions

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, 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 are

headquartered in Charlestown, New Hampshire. The Commissions are advisory and have no regulatory powers, preferring instead to advocate and ensure public involvement in decisions that affect the river and its valley. 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, represent the interests of business, agriculture, forestry, conservation, hydro power, recreation, and regional planning agencies on both sides of the river.

Acknowledgments

The following subcommittee members and river commissioners participated in creating this updated recreation plan for the Connecticut River in the Upper Valley region:

Piermont - Charles Grant, Hal Covert
Bradford - Nancy Jones, Alex Nuti deBiasi
Fairlee - Steven Stocking, Mary Daly
Orford - Carl Schmidt, Marcus White
Thetford - Linda Matteson, Cyrus Severance
Lyme - Freda Swan, David Kotz, Lou-Ann Conroy
Norwich - Jeffrey Mathias, John Lawe,* Peter Richardson*
Hanover - David Minsk, Upper Valley Subcommittee Chair; Caryl Collier
Hartford - Lynn Bohi, Linda Wilson
Lebanon - Nicole Cormen, Joan Monroe, Susan Almy, David Jorgensen

**Connecticut River Commissioner*

We are particularly grateful to the Town of Thetford for providing meeting space.

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RECREATION ON AND ALONG THE CONNECTICUT RIVER

The river's return from years of pollution has transformed the Connecticut into a rich recreational asset for valley residents and visitors. Swimming, fishing, boating, camping, hiking, bicycling, wildlife observation, and sight-seeing along a cleaner, more appealing, and largely still lightly developed shoreland are more widely enjoyed and appreciated in the Upper Valley region than ever before.

The Upper Valley reach of the river, almost entirely impounded by Wilder Dam, features pleasant paddling and deep water throughout the season for summer boating. Many people enjoy ice fishing in the river shallows and on ponds during the winter. Thirty-eight active dams on the tributaries in the region have created reservoirs, conservation ponds, swimming holes, and fishing ponds. Growing networks of foot trails, including the famous Appalachian National Scenic Trail, offer excellent local hiking, while marshes at tributary confluences offer good wildlife watching and waterfowl hunting. The Montshire Museum in Norwich serves as an official visitor center for the Silvio O. Conte National Fish and Wildlife Refuge, and offers river-related education in a recreational atmosphere.

For well over a century before the Connecticut River Byway made it official, the river corridor has been a favored scenic route for a Sunday drive. Byway visitor centers are now introducing residents and visitors to the scenic beauty of the region and its natural and cultural heritage. Paddlers on the river follow their own tour, visiting primitive canoe campsites on protected lands throughout the Upper Valley reach.

Economic Value of Recreation

It is increasingly clear that protection of what we value about the Connecticut River and its tributaries supports "quality of life" as well as an important aspect of local economic health. A wide choice of outdoor recreation opportunities within a few miles of home also translates into opportunities for better public health.

Outfitters, merchants, campgrounds, motels, bed and breakfasts, and other businesses earn income from those who come to enjoy the Connecticut River. Several recent studies confirm the economic value of the area's woods, waters, and wildlife for recreation. A 2007 study in New Hampshire (1) found that about $379 million in total sales is generated by those who are fishing, boating or swimming in New Hampshire fresh waters, or about 26% of all summer spending in the state. Fishing, boating and swimming have about the same economic impact as snowmobiling, downhill skiing,

cross-country skiing, and ice-fishing combined. Interviews with users of 11 public boat ramps in the Dartmouth-Sunapee Region, including at Fullington Landing in Hanover, found that 85% of anglers, boaters and swimmers say they would decrease their intended visits to the Dartmouth-Sunapee Region if water clarity and purity grew poor(er). For the purpose of this study, "water clarity and purity" include milfoil or other invasives, mercury, and algae. Of those who would decrease their intended visits, 23% would leave the state and 26% would leave the region. Approximately 9% would go to some unspecified location in New Hampshire, and 42% would remain in the region. Those recreationalists who would leave the state because of declining water clarity and purity would create a loss of 12%…a loss of about 35,000 visitor days.

The study found that overall, surface water recreation in the 33 towns in New Hampshire's Dartmouth-Sunapee tourism region generates over 100 jobs. These jobs equate to over $2.6 million in personal income and almost $7.5 million in business sales, totaling about 3.5% of the recreational revenue generated by anglers, boaters and swimmers in the state of New Hampshire. A perceived decline in water clarity and purity in the Dartmouth-Sunapee region would lead to a loss of loss of almost $1 million in business sales. While similar figures not available for Vermont, it is clear that Vermont residents and visitors are also enjoying these waters.

The most recent study of wildlife-related recreation, including observing and photographing wildlife, fishing, and hunting, showed that it contributes dollars spent on trip-related expenses, equipment purchases, licenses, contributions, land ownership and leasing, guide services, and other items. Americans spent $122.3 billion on fishing, hunting, and especially wildlife-watching in 2006, equal to one percent of the Gross Domestic Product. In that year, 61 percent of Vermonters and 51 percent of New Hampshirites participated in wildlife-associated recreation (2)

Many more people spend money and time on wildlife-watching than on fishing or hunting. The same study found that 14 percent of Vermonters and 12 percent of New Hampshirites went fishing, 11 percent of Vermonters and 5 percent of New Hampshirites went hunting, and a remarkable 55 percent of Vermonters and 46 percent of New Hampshirites spent time watching, feeding, and/ or photographing wildlife. Vermont ranks second highest in the nation (after Maine) in the percentage of the population that spends time watching wildlife, and New Hampshire fourth highest.

A 2003 study (3) found that boating, fishing, and swimming in New Hampshire's rivers, streams, lakes, and ponds contribute up to $1.2 billion to the state's economy each year, attracting visitors, generating spending, creating jobs and household income, and boosting tax revenue.

The National Wildlife Federation found in 1997 that water-based recreation in Vermont at the time was at least a $109 million business, generating $5.5 million in tax revenues. Fifty-two percent of the sampled statewide households participate in recreation activities along Vermont rivers. Ninety-two percent of outdoor recreation business respondents reported that continual improvements in clean water are important to their business (4). The Vermont Data Tourism Center has found that outdoor recreation visitors spend nearly a third more than the average visitor when they come (5).

BOATING

Because of its quiet waters, beautiful scenery, and easily observable wildlife, the Connecticut River is very popular for canoeing and kayaking. The Upper Valley reach of the river offers enjoyable, easy flat-water paddling, with some quick water below Wilder Dam. Here, a short portage trail allows canoeists to carry their boats around the dam on the New Hampshire side, where TransCanada Hydro Northeast maintains a public picnic area.

Some of the most interesting paddling in the Upper Valley segment is in the five miles below the dam and past heavily developed West Lebanon, where foliage on the riverbank largely spares the paddler a view of the commercial strip close to the river, and the forested Vermont bank and riffles at Johnson Island fill the scene. The City of Lebanon and the local Rotary Clubs are considering a plan to create recreational trail and cartop boat access in West Lebanon's historic Westboro Rail Yard.

While there is no whitewater on the Connecticut River in the Upper Valley segment, there are four stretches of whitewater on tributaries, totaling 18.27 miles. Some of these sections should be run only by experts. The Ottauquechee, Ompompanoosuc, and White Rivers attract kayakers and canoeists during times of high water, and swimmers with inner tubes during the rest of the season. Springtime cascades on the Mascoma River have hosted Olympic qualifying slalom races.

Rowing and sculling are also becoming very popular on the river, particularly at Hanover, where Dartmouth College and Hanover High School crew teams practice and race. The Upper Valley Rowing Foundation offers summer rowing classes for the public and hopes to have a facility on the river. Other classes and events are held using new rowing docks at the Chieftain Motor Inn in Hanover. The Ledyard Canoe Club offers canoe and kayak rentals near the bridge in Hanover. A 1000-foot no-wake zone above the Ledyard Bridge protects swimmers and small craft.

The river's flow through Wilder Dam affects the current both above and below. When the dam is not releasing high volumes, the current may be imperceptible in the impoundment behind it. Sometimes called "Wilder Lake," this impoundment extends nearly 45 miles upstream, well into Haverhill and Newbury. Below the dam, the river resumes its

pace. When the dam is generating power and gates are open, current quickens. Paddlers should be aware of possible sudden water level changes below Wilder Dam.

Wilder Dam creates a long reach for power boat travel. On a sunny weekend day, motor boats, water skiers, pontoon boats, jetskis, rowing shells, canoes, and kayaks share the river. While the impounded river is deeper at all seasons than it once was as a free-flowing river, shallows still exist where tributaries enter and drop their load of sediment. Boaters and ski craft should watch for debris such as submerged or floating logs, and be courteous to people in smaller craft and to riverfront landowners.

TransCanada Hydro Northeast manages water levels in the Wilder impoundment for water-based recreation following the policy set by its predecessor, New England Power Company, in response to public request. During summer weekends, when 85% of river recreation occurs, the water level is kept at 382.6 feet above sea level. The water level seldom goes as low as 380 feet or up to 385 feet, the limits of the dam's operating permit. By Monday mornings, with power generation for business activity resuming, dam managers return the impoundment to a level of 384.5 feet at the dam.

Paddlers can check on water conditions at the Connecticut River Joint Commissions' web page on flow (www.crjc.org/riverflow.htm), which provides links to river gages and to the hydro power company's page on current and projected flows at mainstem dams.

Boating Laws

New Hampshire boating law is in force on the Connecticut River. Boats may not exceed headway speed (no-wake, or 6 mph) within 150 feet (300 feet for ski craft) from shore, islands, bridges, other boats, swimmers, or floats. The legal speed of travel on the river therefore depends upon the river's width, which varies with the volume of water and level of the impoundment.

Between Bradford and Piermont, downstream to Sawyer's Ledge in Fairlee, the river is usually too narrow for legal travel over headway speed. From this ledge to just below the outlet from Storrs Pond in Hanover, the river can accommodate power boating. Below the Storrs Pond outlet, the river is often too narrow for travel over headway speed. Between the Ledyard Bridge, at the foot of the no-wake section, and Wilder Dam, the river is once again wide enough for power boating.

Boating Law Enforcement - Many river users agree that enforcement on the river needs to be increased. More consistent and effective enforcement of boating laws by NH Marine Patrol is necessary, particularly with the steady increase in many kinds of potentially conflicting boat traffic and the vulnerability of the river's banks to erosion from boat wakes. Power boat wakes are one of the key causes of bank erosion on the mainstem above Wilder Dam. The waves they create wash away soil at the base of the bank, undercutting it, particularly if it is unvegetated, and allow the unsupported bank material above to collapse into the river.

Boater Education and Safety - New Hampshire has now joined Vermont in requiring boater education, a step the Upper Valley River Subcommittee strongly supports. This education includes cautions concerning boat wakes, for both the safety of all people using the river and the protection of the riverbanks, and avoiding the spread of invasive plants and animals. The Upper Valley segment sees heavy boating traffic on summer weekends, and also hosts a variety of water-related recreational events. Cooperation between the towns for water rescues is important for public safety on the river.

In New Hampshire, boater education is administered by the Department of Safety. A person under 16 years of age may not legally operate a vessel powered by more than 25 horsepower unless he or she is accompanied by a person 18 years of age or older who has a valid Safe Boater Education Certificate. All motor boaters are required to have passed the course. Boater education would also be useful to those using non-motorized boats, although it is not required.

In Vermont, the State Police administer boater education. The law requires motor boaters over the age of 10 and born after 1974 to take the course to operate a motor boat. Vermont boater education currently does not cover the rules in effect on the Connecticut River.

Boating on the Connecticut River in Vermont and New Hampshire, a pamphlet published by the Connecticut River Joint Commissions and posted on their web site (www.crjc.org) indicates public access sites, no-wake zones, and those sections of the river too narrow for travel above headway speed.

Boater Responsibility - Boat landings in the region sometimes suffer from litter problems, and there is occasional vandalism. Good stewardship by river users is important for the continued health of the river and its value for recreation. Boaters should obey boating speed laws, dispose of litter properly, and avoid creating boat wakes that will erode riverbanks. River recreationists should use designated public access to reach the river, rather than crossing private land.

RECOMMENDATIONS

- NH Marine Patrol should increase enforcement of existing boating laws, to prevent boating conflicts and minimize boat wake-induced riverbank erosion.
- Area towns should coordinate water rescue training and equipment.
- Citizens should obey existing boat speed laws. They should participate in volunteer cleanups, and avoid littering at access sites and along the riverbank.

Water skiing

Boats towing water skiers use the portion of the river that is impounded by Wilder Dam above the Ledyard Bridge, especially between Fullington Landing and the Lyme/Thetford Bridge, often in places too narrow to avoid legal travel far enough from other boats. Boats towing water skiers have right of way. Floating debris, particularly after heavy rains, can make water skiing dangerous on the river.

State rules on water ski courses
The NH Division of Safety Services' Marine Patrol issues permits for water ski courses, and may deny an application if the location or configuration of the waterbody is inappropriate for the use.

RECOMMENDATION

- Boats towing skiers should use only those areas of the river wide enough to allow a turn while maintaining skier speed, staying 150 feet from shore at all times except when getting underway and dropping off.. Avoid waterskiing above the Lyme/Thetford Bridge.

Ski craft & personal watercraft

The rules for personal watercraft, also known as jet skis, are confusing because the definition of the craft is outdated in New Hampshire. A "ski craft" is a kind of jet ski currently defined in this state as any motorized vessel that is less than 13 feet in length, is capable of exceeding 20 miles per hour, and has the capacity to carry no more than two persons. These craft may not exceed headway speed within 300 feet from shore, islands, bridges, other boats, swimmers, or floats, and therefore require a river that is more than 600 feet wide. The only section of the river in the Upper Valley region that is wide enough for legal use of ski craft over headway speed is immediately above and within sight of Wilder Dam.

The three- and four-person personal watercraft are nearly the same size and are similar to ski craft in engine design, maneuverability, propulsion system, shallow draft, acceleration and speed. Because they are currently defined as boats, they may travel over headway speed on any portion of the river that is over 300 feet wide. Inconsistencies in this definition have resulted in confusion as to which laws apply to which craft, and have made enforcement more difficult.

RECOMMENDATIONS

- The N.H. General Court should pass legislation updating the definition of personal water craft to include all such craft under the definition of ski craft, retaining the 300' distance from shore for travel over headway speed, to simplify enforcement and to protect the sensitive river shoreline. The N.H. Department of Safety should support this legislation.
- Citizens should avoid operating jetskis at night and anywhere other than within sight of Wilder Dam.

River Access

There are sixteen boat launches providing access to the Connecticut River in the Upper Valley segment, including nine ramps accommodating trailered boats and seven sites serving only car-top boats. Two other sites provide walk-in access where lightweight craft could be carried in on a long path. Launches vary in size, amount of parking, availability of picnic sites, and other amenities. Rules are needed to guide the management of existing public and private landings, that would include specifications for the maximum bank slope allowable, a riparian vegetated buffer strip, and a site for providing educational information.

Car-top boats - There is a need for further access for canoes and kayaks, because these craft cannot travel as far and as fast as power craft. There is currently no public boat access in Piermont, where the river is suitable only for very shallow draft boats, or in Fairlee, where the riverbank is largely very steep or public access is cut off by the railroad.

Access from tributaries can increase the variety and interest of canoe trips on the mainstem, and disperse the impacts of public use. Lyme, which previously had no public river access, built a car-top boat access in 2000 at the mouth of Hewes Brook. The State of Vermont assisted the Town of Hartford in 2003 with canoe access at Watson Park on the White River, only a short paddle from the Connecticut. Hanover is contemplating a management plan for its conservation property on Mink Brook at North Land Tract. The town eliminated a nearby boat launch at the wastewater treatment plant when the plant was expanded. At Mink Brook, there is presently a modest parking area and a short trail to the brook that

could permit launching car-top boats, as well as a trail along the brook to an outlook on the Connecticut River. A modest car-top river access in Norwich offers no parking and suffers from erosion.

In Orford, a generous donation to the town resulted in the Richmond Conservation Land at the confluence of Jacob's Brook and the Connecticut River, where New Hampshire Fish and Game Department developed a small parking area and a pathway to the north side of Jacob's Brook. While intended primarily for Orford residents, it is open to the public.

Lebanon looks forward to a new public car-top river access, trail, and river overlook at the historic Westboro Rail Yard. While plans have been in place for some years, progress has been stalled by soil contamination and the need for the City to come to an agreement about how to blend public access with the continuing rail function in the area.

RECOMMENDATIONS

- Towns and state recreation agencies should encourage additional car-top boat access for the use of canoes and other small craft, on the mainstem and on tributaries, because of their low impact on the river. Parking should be screened from the river and from nearby roads by a vegetated buffer.
- State transportation agencies should consider providing modest, public river access for car-top boats with parking for 2-4 cars at the Thetford/Lyme Bridge when it is upgraded.
- Fairlee and Piermont should consider locations for car-top boat access.
- Norwich should consider improvements to its river access opposite the Ledyard Boathouse, and identify alternative locations for foot and car-top boat access. VT Fish and Wildlife Department should assist the Town in reducing erosion at this river access and providing a sign on Route 5.
- NH Fish and Game should address erosion control at its Blood Brook access in Lebanon.
- Hanover should proceed with improvements at the North Land Tract to allow boaters to launch their canoes and kayaks in Mink Brook, now that the town has closed the nearby public access at the wastewater treatment facility.
- The City of Lebanon and the local Rotary Clubs should continue to pursue redevelopment of the Westboro Rail Yard, including a riverside path and a car-top boat launch.

Trailered boats - Adequate public access to the Connecticut River for motor boats already exists. There are major public boat ramps located in nearly every town (other than Fairlee and Lyme) where the river is wide enough to accommodate power traffic (Orford, Thetford, Norwich, Hanover, Lebanon, Hartford). These access points are spaced no more than seven miles apart. The Subcommittee believes that adding further access for trailered boats will create additional boating conflicts, contribute to water quality problems, and strain the already limited and inadequate enforcement ability of NH Marine Patrol. The State of New Hampshire generally does not approve permits for boat launches or ramps for private use since the potential for long-term water quality degradation resulting from them is so great. For this reason, and because of inadequate Marine Patrol presence on the river, the Subcommittee agrees that no further private boat ramps should be approved on the Connecticut River.

Changes to several important boat access points in the Upper Valley are occurring. In Orford, the New Hampshire Fish and Game Department has worked with the Town to develop a plan to improve the town's boat landing at the southern edge of the village. Orford's project will better manage the existing use of the site, addressing unregulated parking, bank erosion, insufficient riparian buffer, and storm water runoff, rather than increasing use or introducing a new, higher impact use. In Hanover, the boat access next to the town's wastewater treatment plant was closed permanently in 2005 when construction at the plant claimed space used for launching boats. The town conservation commission determined that the boat ramp at Fullington Landing could serve the need for launching trailered boats in Hanover.

In Lebanon, an informal access on city property near the city's wastewater treatment plant at the mouth of the Mascoma River allows paddlecraft and lightweight small motorboats (shallow draft, up to 20 hp) to reach the river. The site is popular with anglers. The silver maple floodplain forest in this area, believed to be the only remaining such forest in Lebanon, has sustained considerable damage and erosion from ATVs and other vehicles. The City is looking at how to capitalize on the setting of this and adjacent Two Rivers Park (behind Kmart) for public recreation so close to its busy commercial area.

Lebanon looks forward to a new public car-top river access, trail, and river overlook in or near historic downtown West Lebanon. While plans have been proposed for these amenities at the historic Westboro Railyard for several years, progress has been stalled by soil contamination, ownership issues, funding, and the question of compatibility between public recreation and active rail operations onsite. The city's recent receipt of a DES brownfields grant bodes well for petroleum cleanup and eventual establishment of river access. The City of Lebanon and the NHDOT Bureau of Rail and Transit should continue working with all stakeholders to provide public recreational access in West Lebanon that enhances the downtown and promotes stewardship of the river.

RECOMMENDATIONS

- State agencies and towns should discourage construction of new public and private boat ramps or expansion of existing ramps in this segment because of the negative impact of motor boats on the river and because adequate access for these boats already exists in the areas of the river deep enough to accommodate them.
- NH Fish and Game Department should proceed with its project to assist the Town of Orford with its river access improvement, to reduce sediment entering the river at the current ramp, expand the riparian buffer, and move parking further from the river and screen it with vegetation.
- Lebanon should control erosion and install public information boards at its existing Connecticut River access sites below Cole Park in East Wilder and at West Lebanon. Consider how to protect the silver maple floodplain forest from vehicle damage at the West Lebanon launch. Removal of construction debris and installation of recreational amenities is also needed at Two Rivers Park.
- The State of Vermont should place a river access sign on Route 5 for the N. Thetford Boat Landing.

RIVER ACCESS OPEN TO THE PUBLIC IN THE UPPER VALLEY

TOWN	RIVER ACCESS SITE	TYPE OF BOAT	OWNER	RIVER MILE	COMMENTS
Bradford VT	Bugbee Landing	trailered and car-top boats	State of Vermont	244	Shallow water restricts boats to very small craft. Located on the Waits River near confluence. Has covered public information board. Dock managed by Bradford Community Club.
Piermont NH	Sarah Moore Access	walk-in only	Town of Piermont	245	Unmarked trail to river from high terrace.
Orford NH	Orford Boat Landing	trailered and car-top boats	Town of Orford with NH Fish & Game	235	Improvements are planned to reduce sediment entering the river at the current ramp, to expand the riparian buffer, and to move parking further from the river and screen it with vegetation.
	Richardson Conservation Land	walk-in carry car-top boats	Town of Orford	234	Small parking area and long path to north side of Jacob's Brook near its confluence with the Connecticut River.
Thetford VT	North Thetford Landing	trailered and car-top boats	State of Vermont	229	Difficult to use because of accumulated sediment. Has covered public information board. Needs access sign from Route 5.
Lyme NH	Hewes Brook	car-top boats	Town of Lyme	224	Canoe launch at mouth of Hewes Brook. Shallow water.
Norwich VT	Ompompanoosuc River Access	trailered and car-top boats	State of Vermont	221	Has covered public information board.
	Norwich Landing	car-top boats	Town of Norwich	216	This access is not identified with a sign, and has parking for only one or two cars. Needs erosion control.
Hanover NH	Fullington Landing	trailered and car-top boats	Town of Hanover	220	Very heavily used site. Public information board is small and needs room for more content.
	Ledyard Canoe Club	car-top boats	Dartmouth College	216	
Lebanon NH	East Wilder Boat Launch	trailered and car-top boats	City of Lebanon	214	This access needs erosion control and pet waste control.
	Wilder Dam portage	car-top boats	TransCanada Hydro Northeast	213	Parking across Route 10 from trail. Wilder Dam picnic and parking areas also serve hikers to Boston Lot Lake.
	Riverside Park Boat Launch	car-top and small motor boats	City of Lebanon	211	Next to the wastewater treatment plant. Unimproved ramp for paddlecraft and small motorboats. Problems with illegal dumping and use of 4-wheeled vehicles in the city's only remaining floodplain forest.
	Blood's Brook	car-top boats	State of NH	208	This access needs erosion control and identifying sign.

Hartford VT	Wilder Picnic Area at Kilowatt Park	trailered and car-top boats	TransCanada Hydro Northeast	214	
	Wilder Dam Boat Launch at Kilowatt Park	trailered and car-top boats	TransCanada Hydro Northeast	214	
	Lyman Point	car-top boats	Town of Hartford	212	Unmarked trail to the river from the parking lot.
	Watson Park	car-top boats	Town of Hartford	212	Located on the White River, 1 mile from confluence

*River mileage is expressed here in distance from the mouth of the river at Long Island Sound. River mileage shown in *Along the Northern Connecticut River: An Inventory of Significant Instream Features* by MicroDATA Inc., CRJC, 1994, uses distance from the Massachusetts border, 134 miles from the Sound.

Docks - The past five years have seen a dramatic increase in the number of private docks installed on the impounded portion of the Connecticut River mainstem in the Upper Valley, especially in Hanover, Lyme, and Orford. While this may reduce pressure on public access points, docks create a regular maintenance problem for landowners and can lead to substantial loss of riparian integrity and threaten water quality, as riverbanks are cut, re-graded, and cleared of their natural buffer.

In contrast to a lake installation, docks on the river require some attention in engineering and design. Although impounded in most of the Upper Valley, the Connecticut River is not a lake, and dock design must accommodate both regular water level fluctuations and occasional high velocity flows and strong currents. Docks must be anchored and tethered securely to the shore and built so they can be easily removed and stored without damage to the riverbank. High water, which often comes in June after docks are installed for the season, sometimes carries them away, and they drift downstream to become a safety hazard to boaters and a nuisance at Wilder Dam.

Leaving as much native vegetation as possible protects scenic qualities and the landowner's privacy, and safeguards the riverbank. To best protect the riverbank, access to a dock should be by stairs built over the bank with minimal disturbance of soil and vegetation, rather than by steps cut into the bank.

Docks must be removed each fall before the river freezes. Ice damage to docks is common, and each year some are torn loose. States should consider establishing a date for dock removal similar to that in effect for ice fishing houses. Alternatively, towns could advise riverfront landowners to take in their docks by November 1 or when the floating safety lines at Wilder Dam are removed at the end of the recreation season.

New Hampshire limits docks on rivers to seasonal structures of 6 feet by 30 feet for lots with 75 feet or more shoreline frontage. Docks on smaller lots are limited to 4 feet x 24 feet. Docks must be located more than 20 feet from the property line. New Hampshire does not permit structures, such as decks over the water, that transfer activities to the water that are usually associated with the land, such as sunbathing and picnicking. If stairs to the dock are proposed for access, the stairs must be no wider than 6 feet and constructed over the bank in a way that does not require regrading or re-contouring. Property owners considering a dock should check with the New Hampshire Department of Environmental Services (NH DES) to see if they can file a Seasonal Dock Notification or whether a permit is needed. The well-designed docks and riparian buffer at the Chieftain Motor Inn reflect the benefit of this permitting process.

There is currently little or no control over dock installation on the Vermont shore, since New Hampshire jurisdiction extends to the low water mark on the Vermont side, and in some places the state line has been inundated by the construction of dams. Both states have been reluctant to apply their dock rules to this no-man's land, leaving the shoreline vulnerable to uncontrolled riverfront development. For the sake of consistency, Vermont should adopt rules for docks on the Connecticut River similar to those established by New Hampshire. In the absence of state oversight, Vermont towns should consider adopting controls on dock construction.

New Hampshire dock rules rely upon slip limits related to shoreline frontage, and so are inadequate for the Connecticut River, where large parcels of riverfront land, some amounting to several miles, reflect the region's long farming heritage on rich riverbottom soils. Under current rules, over a hundred docks could be built on a single such parcel, even in areas of the river that are highly vulnerable to boat wake-induced erosion and/or too narrow to permit power boats to travel over headway speed.

RECOMMENDATIONS

- The Vermont Legislature should adopt shoreland protection legislation.
- The Connecticut River Joint Commissions should convene a joint NH/VT dock rules committee to agree

upon how to achieve consistent oversight for dock construction on the Connecticut River. The Vermont Agency of Natural Resources should adopt and enforce rules for docks on the Connecticut River and its tributaries. In the absence of state oversight of dock construction, riverfront Vermont towns should consider adopting local control of docks. NH DES should revise its dock rules for the Connecticut River to account for large riverfront parcels and boat speed, to avoid inviting heavy power boat traffic in areas of the river that are too narrow for this traffic, or where riverbanks are susceptible to erosion.

- State agencies should provide written guidance for landowners for the management of public and private boat landings, which would include the maximum bank height appropriate for a ramp, use of a riparian vegetated buffer strip, and a site for posting information. The Connecticut River Joint Commissions should create written guidance for the public on construction and maintenance of river access, including design, riparian buffers, and existing state rules and regulations.
- States should consider establishing a date for dock removal similar to that in effect for ice fishing houses.
- Dock owners should remove their docks by November 1, well before the river begins to freeze.

Marinas - Although there are no marinas sited directly on the river in the Upper Valley, there are several marine dealers and boat shops that serve local boaters. The river's depth, width, flow, and fluctuating level in this segment are incompatible with development of marinas with conventional docks and gas service on the water. These can threaten water quality and increase boat traffic congestion which would lead to greater bank erosion.

RECOMMENDATION

- Area towns and state agencies should discourage construction of marinas on the river.

Invasive species - Invasive aquatic animals and plants are spreading throughout northern New England, and are a direct threat to recreation on the Connecticut River. Eurasian milfoil exemplifies a plant that interferes with boating, swimming and fishing, and can overwhelm native vegetation. This non-native milfoil was introduced to the Connecticut River at Hoyt's Landing in Springfield VT, south of the Upper Valley. It is also present in Lakes Morey and Fairlee, where an expensive control program is underway. Since publication of the previous Connecticut River Management Plan in 1997, milfoil has become established in this reach of the river at the outlet of Lake Morey and at the mouth of Clay Brook in Lyme. A tiny fragment of one of these plants is enough to launch an invasion that is now creeping up this New Hampshire tributary.

Purple loosestrife and Japanese knotweed are becoming common at some of larger boat access sites, such as Fullington Landing in Hanover. These nuisance plants can also squeeze off access to riverbanks and access sites. Other plants, such as the water chestnut with its sharply spined fruit, have been found on a downstream tributary. While the Zebra mussel has not yet invaded the river system, the water chemistry is suitable for it, and the mussel has already infested Lake Champlain, just a short trip on the interstate for a boater or fisherman.

These aquatic exotics reproduce rapidly because they do not have any natural local predators. The primary method of dispersal of all these exotics is by attachment to boat trailers and the hulls of boats. Juvenile or larval mussels can hitchhike in anglers' bait bucket water and boat engine cooling water. Boat wash stations at public boat ramps would help to reduce the threat of transporting aquatic invasives. While much information is available from state agencies, it should also be posted at boat launch sites along with drawings or photographs of each species, to reach boaters directly.

Fishing tournaments, while uncommon on this section of the Connecticut River, are occasions for new infestations, as boats transported from infested waters are launched in this waterway.

Didymo - *Didymosphenia geminata* (Didymo, also called "Rock Snot"), is an invasive freshwater diatom (microscopic algae). It can form extensive colonies on the bottoms of rocky river beds, smothering aquatic life such as macroinvertebrates (aquatic insects, the basis of the food chain). Its appearance is very unattractive, making the water unappealing for recreation.

Didymo is generally a northern circumpolar species of river systems with cobble or rock bottoms, although biologists are noticing a shift to streams in warmer climates and with more nutrients. While it may not pose a threat to sandy or silty portions of the Connecticut River in the Upper Valley Region, it could move through them into tributaries.

Biologists believe that Didymo could continue to be spread by any recreational equipment, including bait buckets, diving gear (neoprene), water shoes, canoes, kayaks, and life jackets. There is currently no way to control or eliminate Didymo. The alga can remain viable for several weeks if kept moist. State natural resource agencies have concluded that the best approach is to attempt to prevent further spread by humans, especially to tributaries.

RECOMMENDATIONS

- Managers of river access sites should provide information on invasives and boating law at these points.
- State agencies should consider providing boat washing stations at ramps for trailered boats, and at Lake Morey, Lake Fairlee, Mascoma Lake, and other water bodies with infestations of aquatic invasive plants.
- Town conservation commissions should monitor local boat access points for nuisance plants.
- Boaters should check and wash their boats and trailers before launching in the Connecticut or its tributaries to avoid introducing alien milfoil, Didymo, Zebra mussels, or other noxious invasives, especially when leaving infested water bodies. Paddlers of car-top boats must also wash their gear.
- Fishing tournament organizers should require boat and trailer checks before boats are launched in the river. Fishermen should carefully discard bait fish originating in another water body, and not use or release them in the Connecticut River watershed.
- State environmental and fisheries agencies should continue to cooperate with watershed groups and conservation commissions to understand and address the Didymo infestation. Provide better color photographs on posters at boat launches. Use fishing license applications to educate the public.
- Fishermen and other recreationists must be educated to carefully clean their gear after visiting the Connecticut River and report sightings of invasive aquatic species to state agencies.
- Local outfitters and guides, outdoor stores where bait is sold, and local recreation programs should educate their customers and participants about Didymo and other invasives, and urge them to clean their gear.

SWIMMING

Water quality and swimming safety - On hot summer days, swimming occurs anywhere along the river where access is suitable. There's often someone swimming in the roped area or even across the river at the Ledyard Boathouse in Hanover or from the many private docks that have appeared in recent years.

In preparation for the update of this plan, and at the request of the Connecticut River Joint Commissions, the New Hampshire Department of Environmental Services, assisted by the Environmental Protection Agency, conducted a Water Quality Assessment of the entire river in New Hampshire in 2004. The river was found to be safe for swimming throughout the Upper Valley region from Bradford and Piermont down to the mouth of the White River.

From the mouth of the White River down to Cornish and Windsor, however, bacterial contamination from combined sewer overflows sometimes renders the river unsafe for swimming. The lower part of this reach also receives treated wastewater from the three plants serving Hanover, Lebanon, and White River Junction. Boaters in Hanover, Lebanon and Hartford occasionally report a noticeable odor that detracts from the river experience.

Bacteria in the water affect the safety of swimming in the river and its tributaries, and have been noted at least since 1993 in the Lebanon/Hanover area of the mainstem. Bacteria reach rivers through poorly functioning septic systems and also through runoff, such as drainage from a pasture, stormwater washing over areas where dog walkers do not pick up after their pets, or combined sewer overflows, where runoff from heavy storms can overwhelm a wastewater treatment plant and send untreated sewage into the river. Bacteria counts are variable, but are likely to be higher in the river after a heavy storm. There is currently a problem with pet waste at the East Wilder boat launch in Lebanon. Pet owners everywhere should pick up after their pets.

Mink Brook and most of the White and Ompompanoosuc Rivers are safe for swimming. Portions of Great Brook and the Mascoma River and its tributaries in Lebanon are unsafe for swimming due to bacterial contamination from agricultural sources or combined sewer overflows. The safety of swimming in other Upper Valley tributaries has not yet been determined by the states, including a heavily used swimming area at True's Brook in Lebanon.

A failure at the Bethel, Vermont wastewater treatment plant in the summer of 2000 closed the White River to swimming and other contact recreation for 44 days, and similar short term violations occurred during the summer of 2002 at the Hanover plant. Fortunately, the Bethel problem has been rectified and the Hanover plant is being upgraded. The public should be notified immediately if there is a suspected water quality violation, especially during the summer recreation season.

Swimming is hazardous just below Wilder Dam, where the water level and current can rise suddenly. Jumping from bridges, particularly from railroad bridges, is unsafe and is prohibited in some towns by local ordinances.

In recent years, some developers and riverfront landowners have proposed constructing artificial beaches on the river. Removal of the naturally vegetated riparian buffer for such a project opens the shore to erosion, and invites water pollution through the addition of phosphorus and other nutrients attached to imported sand. Natural river scouring and flooding will soon transport the sand downstream. Towns and state agencies should discourage construction of new public and private beaches because of the negative impact of imported sand and removal of the riparian buffer on water quality.

RECOMMENDATIONS

- NH DES should assess water quality, to assure that the river is safe for swimming.
- The City of Lebanon should continue its program to eliminate combined sewer overflows and to identify sources of bacterial contamination in the Mascoma River watershed.
- Towns should enforce local regulations that protect water quality, such as treating stormwater effectively, requiring a meaningful setback for roadways from riverbanks, and protecting riparian buffers.
- Wastewater treatment plant operators should notify the public immediately if there is a suspected water quality violation at a wastewater treatment plant.
- Towns and state agencies should discourage construction of new public and private beaches because of the negative impact of imported sand and removal of the riparian buffer on water quality.
- Area towns should consider how to address the problem of pet waste. Pet owners everywhere should be educated to pick up after their pets.

RIVER CAMPING & THE CONNECTICUT RIVER WATER TRAIL

The natural appeal of the still-rural river corridor, the increased pace of land conservation by landowners willing to share their property with the public, and the rising numbers of paddlers seeking an extended river experience, prompted the Upper Valley Land Trust, with support from the Connecticut River Joint Commissions, to create a string of seasonal primitive canoe campsites in the Upper Valley and beyond, beginning in 1992.

Many sites are maintained by volunteers, such as town conservation commissions or scout groups, and TransCanada Hydro Northeast owns and maintains a campsite on Gilman Island. Dartmouth's Ledyard Canoe Club manages the Titcomb Cabin on the northeast side of Gilman Island. The cabin was built in response to the construction of Wilder Dam in 1950, which raised the level of the Connecticut by 15 feet, and submerged Johnny Johnson Island, Chase Island and Occum Island, on which the Club had cabins. There is also a private commercial campground on the river in Orford. Inn-to-inn canoe trips have the added benefit of commercial value to local inn owners.

Experience has proven the value of designated sites in carefully selected locations, to help focus recreational use in places that can be monitored, and reduce unauthorized camping and trespassing in places where campers are not welcome. There is no charge for use of the primitive canoe campsites, which are available on a first-come-first-served basis, with a limit of two nights per site. Use of camp stoves is encouraged to help minimize damage to local vegetation and prevent problems with fires.

The sites are already well used, and wide promotion of the system is not recommended. The campsites are intended for canoe and kayak access from the river only, although power boaters sometimes use the canoe sites. While land-based access is discouraged, this has also become a problem at several sites, and some have been used by homeless people on an extended basis. Limiting the use of sites to one night would help avoid overuse.

The Upper Valley Land Trust is evaluating campsite needs in the area from Haverhill/Newbury to Charlestown/Springfield. Further campsites, that are well-sited to avoid damage to rare plants and animals and discourage land-based access, would be an asset to river recreation.

There is potential for the campsite system to lose its appeal if it is misused, becomes overcrowded, if campers do not practice "leave no trace," and if the system is not well monitored. There is currently no coordinated monitoring or management of the canoe campsite system, although the National Park Service has produced campsite stewardship guidelines for the Connecticut River, and the Connecticut River Watershed Council has expressed an interest in managing the Water Trail. An overall management plan will be useful for various groups to follow in tending individual campsites.

Primitive canoe campsites open to the public in the Upper Valley include:

TOWN	CAMPSITE NAME	CAMPSITE MANAGER	RIVER MILE	CAPACITY	AMENITIES
Bradford VT	Bugbee Landing	Bradford Elementary School 802-222-4077	244	12	fire ring; privy located at adjacent fairground
Piermont NH	Underhill Camp	Piermont Conservation Commission 603-272-4359	241	12	cleared tent site, box privy, fire ring
Fairlee VT	Birch Meadow	Hulbert Outdoor Center; Upper Valley Land Trust	233	12	cleared tent site, box privy, fire ring, picnic table with shelter/lantern supports
Thetford VT	Roaring Brook	Upper Valley Land Trust	230	12	cleared tent site, box privy, fire ring, picnic table with shelter/lantern supports, simple dock.
Hanover NH	Gilman Island	TransCanada Hydro Northeast	215	10	cleared tent site, privy, fire ring, picnic table
		Ledyard Canoe Club	215	10	Titcomb cabin; reservation required

*River mileage is expressed here in distance from the mouth of the river at Long Island Sound. River mileage shown in *Along the Northern Connecticut River: An Inventory of Significant Instream Features* by MicroDATA Inc., CRJC, 1994, uses distance from the Massachusetts border, 134 miles from the Sound.

RECOMMENDATIONS

- CRJC should encourage an organization to take active responsibility for coordinating the system of primitive canoe campsites.
- TransCanada Hydro Northeast and its successors should continue to maintain its canoe campsite at Gilman Island or consider donating it to the Upper Valley Land Trust.
- Nearby businesses and paddling groups should consider adopting a campsite to assist with maintenance.
- Canoeists should help monitor the condition and occupation of the campsites.
- The Connecticut River Byway Council should encourage inn-to-inn canoe trips for their commercial value to local inn owners and to relieve pressure on the canoe campsite system.

FISHING

Fishing is nearly a year-round sport in the Upper Valley, at least on the Connecticut River, where fishermen wait anxiously through the fall and early winter until the ice is strong enough to allow them onto frozen setbacks and the mainstem. The tributaries offer fine fishing for cold water species such as rainbow, brown, and the native brook trout, and the mainstem, impounded behind Wilder Dam, provides habitat for warm water species such as perch, pickerel, bass, and walleye. New Hampshire fishing licenses or Vermont resident licenses are required for the Connecticut River, and are good for fishing on all the river's tributaries up to the first bridge.

Bob houses - Fishermen should remove their bob houses well before the river's ice begins to break up in spring. Fishing just below the dam is dangerous due to sudden increases in water levels and flow, and fishermen should avoid anchoring their boats just below Wilder Dam for this reason.

Fish tissue toxins - While fishing is good sport, the quarry is no longer completely safe eating. Mercury, largely delivered by prevailing westerly winds, has infiltrated the food web and accumulated in resident fish to the point where the State of New Hampshire considers the entire river system, and others in the region, to be contaminated with varying levels

New Hampshire Fish Consumption Guidelines: pregnant and nursing women, and women who may get pregnant, can safely eat one 8-oz. meal of freshwater fish per month. Children under age 7 can safely eat one 4-oz. serving per month. All other adults and children age 7 and older can safely eat four 8-oz. meals per month of freshwater fish. Bass and pickerel should be 12 inches or less in length while following the above guidelines. Advisory does not apply to stocked fish. For rainbow and brown trout, women of childbearing age and children can safely eat one meal per week, others can eat 6 meals per week. Brook trout could be either stocked or from a reproducing population, therefore they should be consumed at the rate of the general statewide advisory.

Fish from Mascoma Lake have been shown to have higher than average mercury concentrations. Sensitive populations should not consume any fish from these waters; others may consume two meals per month.

The NH Fish & Game Department's web site has up to date information.

of mercury and has issued fish consumption guidelines. Congress and the states should act to reduce the amount of airborne mercury delivered to the Connecticut River Valley.

In 2000, the U.S. Environmental Protection Agency worked with the four Connecticut River states to conduct a comprehensive fish tissue toxin study, whose results were released in 2006 (6). This landmark study, which may be the first river-wide study of fish tissue in the nation, represents significant cooperation among the four states, each of which contributed substantial funding and staff. The concept for the study comes directly from the public, as raised in the 1997 *Connecticut River Corridor Management Plan*.

Biologists sampled white sucker, yellow perch, and smallmouth bass from eight sections of the Connecticut River, choosing fish species that represent different levels of the food chain and are widely found in the 410 mile long river. Smallmouth bass, yellow perch and white suckers were collected during 2000 from the mainstem of the Connecticut River and composite samples were analyzed for total mercury, coplanar (dioxin-like) PCBs and organochlorine pesticides, including DDT and its breakdown products.

Upper Valley Region fish were sampled as part of Reach 5 (Wilder Dam to Vernon Dam) and Reach 6 (Wilder Dam to Moore Dam). The study found that total mercury concentrations in all three species of fish were significantly higher upstream than downstream, and are a threat in this region to subsistence fishers and also to mammals and birds that eat the fish. Risk from PCBs was generally lower in upstream areas than in downstream areas, although this varied by fish species and was different for the humans, mammals, birds or fish that eat them. DDT breakdown products pose a risk to subsistence fishers and to fish-eating birds such as kingfishers, but not to recreational fishermen or to fish-eating mammals such as otter.

Lead fishing tackle is also a source of poisoning of loons and other waterfowl. Both states prohibit use of lead sinkers weighing one ounce or less and jigs less than one inch long on all fresh waters to protect wildlife from this toxic substance. Loons that eat lead tackle usually die within a matter of weeks. Fishermen should replace their tackle immediately.

Fish disease - In 2005, a new fish disease known as Viral Hemorrhagic Septicemia (VHS) was discovered in Lake Ontario, and has spread rapidly in the Great Lakes, resulting in the deaths of tens of thousands of fish. Unfortunately, there is no cure for the disease, and it cannot be controlled - only contained. Containing the spread of this deadly fish virus and preventing it from entering Vermont and New Hampshire will require fish testing and surveillance programs and restrictions on the movement of live fish and water. At least 25 species of fish, including some of the most popular sportfish in the region, are susceptible to VHS. In April, 2008,Vermont enacted new baitfish regulations intended to help deter the spread of VHS by preventing transfer of potentially infected baitfish from one waterbody to another. Movement of fish from one water body to another is illegal in both states, to protect the fisheries. For more information, contact NH Fish and Game Department or VT Fish and Wildlife Department.

RECOMMENDATIONS

- The U.S. Congress and the states should take immediate action to reduce mercury contamination of the region and follow up on recommendations for further research given in the Connecticut River Fish Tissue Contaminant Study.
- Fishermen and hunters should replace their lead sinkers, jigs, and shot with safe gear immediately.
- Fishermen should remove their bob houses well before the river's ice begins to break up in spring, and avoid anchoring their boats below Wilder Dam.
- Fishermen should observe the new baitfish regulations in Vermont and apply the same care in New Hampshire waters, to help protect fisheries from VHS disease.

LAND-BASED RECREATION

The Upper Valley offers a wide array of outdoor land-based recreation opportunities throughout the seasons, in a spectacular environment. Walking and trail activities are the most popular form of recreation in the United States, including among older Americans, according to nation-wide research in 2003 (7).

A 2003 survey by New Hampshire (7) found stronger public interest in funding for non-motorized activities than for motorized activities, and more enthusiasm for land, water, and species protection than for recreation development. A similar survey by Vermont (9) showed that 91.6% of Vermonters felt it was important to provide opportunities for non-motorized recreation, and 63.6% felt it was not important for the state to provide opportunities for riding motorized recreation vehicles.

The most popular recreational activities in New Hampshire, according to a survey in the same year, are walking, wildlife observation, and hiking, activities that require plenty of open space. The New Hampshire survey found that half of this recreation takes place within ten miles of home, and that there is stronger public interest in funding for non-motorized activities than for motorized activities. The survey also found that there is more

enthusiasm for land, water, and species protection than for recreation development.

Similar research in Vermont in 2002 (9) showed that the most popular recreational activities are hiking in the warm-weather months, and downhill skiing, followed by cross-country skiing and snowshoeing, in the winter. A higher percentage of Vermont's residents enjoy watching wildlife than any other in the country.

Another 2002 study (10) found that 70% of Vermonters and 72% of New Hampshire people surveyed said that it is very important to ensure there is access to areas where there are no motorized vehicles or logging in the forests of northern New England. Sixty-four percent of New Hampshirites and 68% of Vermonters said access to the forests of northern New England is very important for hiking, but only 21% and 28%, respectively, felt such access was very important for snowmobiling. With regard to designating more areas for non-motorized wilderness-like recreation, 68.5% of Vermonters agreed or strongly agreed (8).

Private Lands

People in the Upper Valley have long been fortunate to have the chance to walk, hike, snowmobile, hunt, and ski on land belonging to others, with the understanding that the visitor would leave no trace and respect the property as if it were his or her own. This long-standing tradition in northern New England is now threatened as the pace of land conversion quickens and new homes crowd into formerly wooded areas. New residents coming from regions without such a tradition may not be prepared to allow their land to remain open to public use. Land is posted and trails are blocked, thus diminishing the sense of neighborly cooperation which has been a hallmark of the region for so long, and closing off recreational opportunities to many. For example, the amount of posted land in Orange County, Vermont, increased from 1,782 acres in 1991 to 19,892 acres in 2004, an increase of 1016%.

Those wishing to use another's land for recreation must respect this use as a privilege, not as a right. Picking up litter, leaving gates as found, parking courteously, and asking permission of the landowner are all essential. Regular visitors and user groups can offer to help the landowner maintain trails or repair bridges.

Landowner Liability - Fear of liability is often cited as factor in the decision to post land against public recreation. Landowners should be aware that both New Hampshire and Vermont have enacted laws protecting private landowners who open their land to the public for recreation. The landowner must not charge a fee for this access and must not purposely create a hazard. Land assessed under the Current Use program in New Hampshire is eligible for a 20% extra benefit if it is open for public recreation. Conservation commissions and recreation groups can help inform landowners about these protections and benefits. Both states have small insurance policies that may help defend landowners from suits for use of state official OHRV trails maintained by recreation clubs for winter use, but this does not yet apply to summer use.

RECOMMENDATIONS

- State recreation agencies should educate landowners about the benefits of leaving land open to the public, including NH's 20% recreational adjustment under Current Use as well as Class A/B trails, and the liability protections offered by existing laws.
- Snowmobile clubs, the Upper Valley Trails Alliance, the Dartmouth Outing Club, hiking groups**,** and bicycle clubs can provide monitoring, trail watches, and peer education on the proper use of private land to help prevent trespassing and littering, and to encourage landowners to keep their land open to the public**.**
- All recreationists should seek permission from landowners who have not posted their land, and demonstrate respect and courteous use of their land**.**

Land Protection for Recreation - Trails and other open space for active or passive recreation require plenty of space where the public is welcome, although New Hampshire's Land and Community Heritage Investment Program ("LCHIP"), which was established in part to help protect land for public recreation, is not fully funded. As development continues in the Upper Valley, more and more land that was previously open to the public is becoming subdivided, sold, and posted. The riverfront is especially threatened.

There are several federal and state programs, such as the federal Land and Water Conservation Fund, the federal Scenic Byway Program, SAFE-TEA, the Vermont Housing and Conservation Board, and New Hampshire's LCHIP, that can help communities protect scenic views and create trails and other recreation assets. Towns should take advantage of this and other opportunities to protect land for public recreation and open space. Regional planning commissions can help coordinate recreation and open space plans among communities and across the river.

Conserving land brings new opportunities for public recreation, and the Upper Valley Land Trust has emphasized this benefit in a recently expanded section of its web site that provides information on trails open to the public on conserved lands.

RECOMMENDATIONS

- The New Hampshire Legislature should provide sustained funding for LCHIP.

- The Upper Valley Land Trust should continue with its exemplary work in land conservation, providing public recreation access for car-top boats, wildlife observation, or trails where possible and appropriate.
- Regional planning commissions should coordinate recreation and open space plans among communities and across the river.
- Towns should identify opportunities, when land use is changed, to retain easements for public access for trails, birding, car-top access, or other low impact public recreation.

Walking & Hiking Trails

Every town in the Upper Valley offers hiking and walking trails enriched by views of the river and surrounding hills. The Appalachian Trail is the best known, crossing the Connecticut River on the Ledyard Bridge. This 2,174-mile-long National Scenic Trail, the longest national park in the United States, enters the Upper Valley in Hartford and Norwich, passes through downtown Hanover, and continues north through Lyme, Orford, and Piermont, maintained by the Dartmouth Outing Club and local volunteers.

Another major cross-river trail under development links the four towns in the bi-state Rivendell School District. The Cross-Rivendell Trail starts on Mt. Cube in Orford, crosses the river, and travel through Fairlee and West Fairlee to Flagpole Hill in Vershire.

Energetic conservation activity by generous landowners working with the Upper Valley Land Trust has led to creation of many other trails on private land open to the public, and the Land Trust hosts a popular "Summer [and Winter] on the Land" series of walks and tours to conserved properties. The Hanover Conservation Council has published a detailed map of that town's extensive trail system, and the Lyme Conservation Commission has created a series of trail guides for town properties. Riverside trails are under consideration in West Lebanon, and the City has published a comprehensive trails and recreation map of public lands. Hartford has published a guide to its town parks, which include many riverside recreation areas.

Trails throughout the Upper Valley are enjoyed by hikers, snowshoers, walkers, joggers, bicyclists, cross-country skiers, and often also by horseback riders. Scenic views of, and from, Upper Valley ridgelines and hilltops are key to the appeal of outdoor recreation in the region. Trail networks can be incorporated into public utility corridors. Urban planners should find ways to incorporate trails into the urban landscape. Development near the Appalachian Trail or related side trails should be evaluated with respect to the scenic character and primitive qualities of the trail corridor. Whether in urban or wilderness settings, public access should be retained wherever possible, conforming to best management practices.

RECOMMENDATIONS

- Upper Valley towns should explore federal and state funding programs, such as SAFE-TEA, to create trails and other new recreation opportunities, and create trail guides to town owned properties. Trail maps should describe trail manners and indicate what uses are permitted.
- As development is being proposed, landowners and land use boards should consider its impact on existing or potential trails. Towns should carefully review development projects to protect scenic views, including views of Upper Valley ridgelines and hilltops.
- Trail planners should work with willing private landowners to create trail connections for people and wildlife through private property, particularly in association with the well-established Appalachian Trail, snowmobile trails, and cross country ski trails.

Northern Rail Trail

Twenty-five miles of a former 59-mile rail line from Lebanon to Boscawen have become a trail through the efforts of local volunteers, and another 34 miles are under development. Abandoned railroad rights-of-way can serve as bike paths as long as abutting landowners' access remains. For part of its route, the trail follows the Mascoma River. The trail is open for hiking, horseback riding, bicycling, snowmobiling, cross-country skiing, and dog-sledding. ATVs and motorbikes are allowed only when there is snow cover in winter.

A potential pedestrian and bicycling connection between Lebanon and White River Junction exists across the railroad bridge linking these two communities, since only one of the two tracks across the bridge is now being used, and only by very slow-moving trains.

Upper Valley Trails Alliance - Growing interest in healthy outdoor recreation and the development of local trail networks on both sides of the river led to creation of the Upper Valley Trails Alliance in 1999. The Trails Alliance is a coalition of trail and land protection organizations, civic groups, and landowners that support multi-modal trails and the creation of a cohesive trail network. The Alliance brings trail users together to develop new trails, link existing trails, work on use issues, and heighten public awareness of trails. The Trails Alliance's "Upper Valley Trails for Life" project, a five year project funded with a major grant in 2003, is aimed at enhancing physical activity

and public health through walking and the use of trails. Physicians at Dartmouth Hitchcock Medical Center are now prescribing walking programs to their patients as part of this partnership. The Trails Alliance has published a guide to show a number of trails in the region, maintains a calendar of trail events on its website, and coordinates National Trails Day events in the region.

Trail maintenance - Trail erosion can become a water quality concern, especially for nearby small headwater streams that harbor trout. Hikers and cyclists should avoid trails in wet conditions when they are saturated from snow melt and rain. Trails require special care between sugaring season and Memorial Day to prevent erosion and damage. Since higher elevation soils take longer to dry out, recreationists should stay below 1000 feet until May 1, below 2,000 feet until May 15, and below 3,000 feet until Memorial Day. This is a transition time for the trail environment. People know not to venture onto the thin ice of ponds during the transition between seasons, and should learn to avoid trails during similar seasonal changes.

Trails should be carefully designed and maintained to prevent erosion into streams. To protect wetlands and streams from trail erosion, both states now have rules in place for trail construction. In New Hampshire, if trail construction or maintenance is to cross a surface water or wetland, DES requires a "Notification of Trail Activities Having Minimum Impact" or possibly a wetlands permit. Trail builders should use "Best Management Practices for Erosion Control During Trail Maintenance and Construction," developed in 1994 by the NH Department of Resources & Economic Development. In Vermont, permits from the Water Quality Division of the VT Agency of Natural Resources are required for trail stream crossings. Projects should be reviewed by a stream alteration engineer. Any work in wetlands requires a Conditional Use determination, and possibly a permit. Paths with hardened surfaces and those disturbing over one acre require a Construction General Permit and development of an erosion prevention and sediment control plan. Consult the Vermont Trails and Greenways Council Manual.

The demands of maintenance can be a perplexing issue for volunteer conservation commissions and other groups entrusted with caring for public trails. Some area communities have decided not to widely publicize trails for which they cannot muster enough volunteers to maintain. Private landowners sometimes find that heavy public use of their trails strains their ability to maintain them.

RECOMMENDATIONS

- The Upper Valley Trails Alliance, Dartmouth Outing Club, Appalachian Mountain Club, Appalachian Trail Conference, and other trail groups should actively encourage hikers, horseback riders, and other trail users to help with trail maintenance and avoid trails in wet conditions, especially when they are saturated from snow melt and rain. Citizens should avoid using trails in wet conditions and volunteer to help with trail maintenance for their chosen form of recreation, whether hiking, mountain biking, cross country skiing, or snowmobiling**.**
- Trail organizations should offer to work with private landowners to do trail maintenance, drawing upon the trail tool equipment collection funded by the Connecticut River Joint Commissions and managed by the Upper Valley Trails Alliance.
- The Upper Valley Trails Alliance should pursue a trail connection across the Lebanon-White River Junction railroad bridge.
- Town conservation commissions should encourage snowmobile groups, the Upper Valley Trails Alliance, and other local recreation groups to provide monitoring, trail watches, and peer education, and encourage local stewardship of recreation areas (campsites, trail heads, trails) and responsible public use.

Bicycling

Road bicycling is a popular family and touring sport in the Upper Valley and is a healthy way to enjoy the varied scenery of the region. (12) The river roads are especially attractive routes for their easy cycling and fine river views, and Route 5 north of Norwich and the cyclist-friendly wide shoulders of Route 10 between Hanover and Lyme are busy road bike routes. An increasing number of people use bicycles to commute to Hanover and Lebanon from nearby towns. Many commercial bicycle tours visit the region, with overnight stays at local inns and bed-and-breakfast facilities. Hartford has built an Alternate Transportation Path connecting the village of Wilder to the Dothan Brook School. Where there are bicycles, there may also be roller blades, joggers, dogs, and strollers. Cyclists must obey rules of the road. A good reference is *Adventures in Paradise: Exploring the Upper Connecticut River Valley of Vermont and New Hampshire (On a Bicycle!),* by Dick Mackay.

Safe traveling for cyclists is sometimes a concern, such as along Route 5 from Norwich through Thetford and on Route 10 in Lyme between the village center and the town's recreation area on Post Pond. Increasing use of hybrid cars with sometimes silent engines means that cyclists can no longer rely on hearing cars coming up behind them. Towns and state transportation agencies should look closely at how to encourage safe bicycling, perhaps with dedicated bicycle paths while considering the aesthetic changes and effect of widening roads for bicycle lanes upon

traffic speed. There may be opportunities to cooperate with local snowmobile clubs to create trails that can serve each sport in its season.

Off-Road Bicycling - Back roads, logging roads, and even hiking trails have attracted many Upper Valley cyclists in recent years, and Vermont estimates that off-road bicycling will increase 55% by 2050 (5). Un-maintained town roads (Class VI in New Hampshire, and Class IV in Vermont) remain public rights of way, although they are no longer maintained, and are open for bicycling. However, it is often difficult to distinguish private drives and logging roads from public ways, and landowners may put up gates on Class VI roads, but the public has the right to pass.

Mountain bike tires are usually outfitted with nubs to give them greater traction for rough terrain. These can greatly contribute to trail erosion. Off-road biking is a water quality concern especially in spring, and bikers should stay off trails until Memorial Day, when the trails have had a chance to dry out.

Because off-road bicycles cause erosion, many conservation easements restrict this kind of recreation when land is protected. Several Upper Valley communities preparing to conserve large tracts of land have approached the issue constructively, by inviting local stakeholders, including the International Mountain Bike Association, to share in the process of planning for the land's management and deciding what kinds of recreation will be permitted on the property and where.

RECOMMENDATIONS

- Upper Valley towns should enhance bicycle safety by promoting construction of bike paths, both dedicated and adjacent to highways.
- State transportation agencies should improve bicycling safety by assisting towns in creating bike paths, and promote the use of abandoned railroad rights-of-way as bike paths while continuing to permit landowners to access their land across tracks.
- Regional and local planning commissions should help communities identify places where bicycle shoulders could be added without destroying the character of a local road.
- Mountain bikers should stay on trails that are hard enough to sustain this use, and avoid cycling on steep foot trails or in wet conditions when their tires are more likely to leave ruts and cause permanent trail damage. Cyclists should be certain that they have permission from the landowner before they ride, and close any farm gates they use. They should be prepared to volunteer to help maintain local trails where they ride.

The Connecticut River Birding Trail

Bird and wildlife-watching are growing in popularity among all age groups and offer a way to enjoy natural places with little or no harm to the land or river. The river's role as a migration corridor brings a rich variety of birds, particularly waterfowl, to the region in spring and fall. Several local groups, including the Mascoma Chapter of the Audubon Society of New Hampshire and the Vermont Institute of Natural Science, offer public bird walks.

The Connecticut River Birding Trail, a series of nature observation sites in riverfront towns from Rockingham to Haverhill, was established in 2001, and a descriptive map is available to the public through the Connecticut River Byway visitor centers. Birding Trail stops in the Upper Valley are:

Bradford, VT
- Wright's Mountain

Fairlee, VT
- Palisades Cliff
- Lakes Fairlee and Morey

Thetford, VT
- Houghton Hill View Hike
- Thetford Hill State Park
- The Mystery Trail at Union Village Dam
- Bill Hill, Thetford Center
- Mimi's Trail, Thetford Hill

Norwich, VT
- Ompompanoosuc River Mudflats
- Gile Mountain Tower Trail
- Montshire Museum
- Ballard Trail and the Grand Canyon

Hartford, VT
- The Hazen Trail
- Hurricane Forest and Wildlife Refuge Park
- Dewey's Mills Pond
- Quechee Gorge and State Park
- Joe Ranger Road

Orford, NH
- Reed's Marsh Wildlife Management Area
- Mt. Cube

Lyme, NH
- Chaffee Wildlife Sanctuary
- Hewes Brook Wetland
- Wilder Wildlife Management Area
- The Pinnacle
- Grant Brook

Hanover, NH
- Huntington Hill Farm Wildlife Management Area
- Balch Hill
- Mink Brook Nature Preserve
- Mink Brook Natural Area

Lebanon, NH
- Goodwin Park
- Boston Lot Lake
- Northern Rail Trail

Several groups have worked together to extend the Connecticut River Birding Trail both north and south of the region, establishing a river-long network of birding and nature observation sites where the public is welcome to explore and enjoy the area's natural heritage.

RECOMMENDATION

- Birding Trail visitors should take care in parking to avoid interfering with private property or traffic.

Valley Quest

Vital Communities of the Upper Valley has created an innovative form of recreation, a series of treasure hunts known as Quests. (11) Often developed in cooperation with local schools, Quests share the natural and cultural history of the region using hand-drawn maps and riddle-like clues to lead to special places such as remote lakes, historic landmarks, and forgotten cemeteries. Natural and historical sites in the Upper Valley are the subjects of these quests:

Bradford, VT

- Bradford Memorial, Wright's Mountain

Piermont, NH

- Piermont Village

Fairlee, VT

- Fairlee Depot, Fairlee Glen Falls, Miraculous Trees, Palisades, Lake Morey

Orford, NH

- Boat Landing, Brick Quest, Flat Rock, Indian Pond, Bear Rock, Gandalf Quest, Gimli & Legolas

Thetford, VT

- Houghton Hill, Lonesome Pine, Moving Houses, Peabody Library, Thetford Canoe, Union Village, Thetford Center, T.E.S. Wetland

Lyme, NH

- Pinnacle Hill, Sheep Quest, Beal Cemetery, Chaffee Marsh, Lyme Center Dances, Porter Cemetery

Norwich, VT

- Elm Street Loop, Gile Mountain, Grand Canyon, Montshire, Beaver Meadows, Lewiston Village, Podunk

Hanover, NH

- Amphitheater, Balch Hill, Libraries of Hanover, Mink Brook, Moose Mountain, Velvet Rocks, Connecticut Island, Mink Brook II, Storr's Pond, White Pine Valley

Hartford, VT

- Historical Museum, Recycling, White River Junction By the Numbers, Junction Quest, Lyman Point, Center of Town, Hurricane Forest, Jericho Village, Salamander Meander, White River Village, 6 quests in and around Quechee

Lebanon, NH

- Colburn Park, Runnemede School, Boston Lot, Dana House

RECOMMENDATION

- Upper Valley schools and conservation commissions should consider creating a Quest within their town, using guidance and curricula created by Vital Communities of the Upper Valley.

Hunting

Hunting as a recreational pastime has decreased in recent years, although it is still significant. In Vermont, 81% of hunting takes place on private land, and in New Hampshire 76%, with the remaining hunting on public land. These statistics confirm what many already well understand: that respect for private landowners and courteous use of their land is the key to keeping private land open. Keeping large tracts of land open and undeveloped protects wildlife habitat and water quality, and can also help protect the tradition of hunting. Hunters in both states continue to notice a steady increase in posting of private land against hunting.

The Connecticut River's role as a migratory flyway brings a wealth of waterfowl to the river each spring and fall, especially to the shallow waters of "setbacks" such as Reed's Marsh in Orford or at the mouths of tributaries, such as the Ompompanoosuc River.

New Hampshire and Vermont have enacted reciprocal migratory waterfowl hunting rights for licensed waterfowl hunters in a Connecticut River Zone. A person holding either a Vermont or a New Hampshire resident hunting license for migratory waterfowl and coots may hunt them in this area subject to New Hampshire laws. It is illegal to use lead shot while hunting migratory

Waterfowl Hunting: The Connecticut River Zone for waterfowl hunting in the Upper Valley includes that portion of New Hampshire lying west of the line defined by Route 10 and Route 12-A. In Vermont, this zone lies east of Interstate 91; hunters on the Vermont side of the Connecticut River Zone must follow New Hampshire regulations for waterfowl hunting.

waterfowl. Steel shot should be used instead.

In more and more areas frequented by migrating waterfowl, there are homes located close to the water. Hunters should be aware that in New Hampshire, no one may discharge a firearm within 300 feet of a permanently occupied dwelling without the landowner's permission.(RSA 207:3-a). In Vermont, a property owner may establish a 500' safety zone around any occupied building, using signs provided by the VT Fish and Wildlife Department (Title 13 3705; Title 12 5793). Vermont law does not provide for a mandatory safety zone around a building, although there may be local ordinances in effect.

RECOMMENDATIONS

- Hunters should seek permission from landowners who have not posted their land, and demonstrate respect and courteous use of their land.
- Hunters should replace their lead shot with steel, to avoid contributing to lead poisoning of waterfowl and other wildlife.
- Hunters, including those seeking waterfowl, should not discharge a firearm near a home.

All-Terrain Vehicles

Numbers of all-terrain vehicles are increasing by 10-15% per year. All vehicles must be registered if used off the owner's property, and none can be used on private land without written permission from the landowner. Many farm and forestland owners find them to be a convenient way to get around on their property, and the comments below do not refer to them, but to recreational use on public land or land owned by others.

There is rising demand among ATV riders for trails similar to those used by snowmobiles in winter. The difference is that snowmobiles traveling on frozen, snow-covered ground do not have the same ability to cause erosion, degrade wetlands, or disturb breeding wildlife. Compared to foot traffic, motorized travel by ATVs, dirt bikes, and other wheeled vehicles creates damage that can be especially harsh depending on the season. One vehicle in one day can do damage that may take years to heal. Public and private owners of conservation land are especially challenged by wetlands degradation and soil erosion from uninvited riders, which may harm water quality downstream. Enforcement is extremely difficult.

Both states are actively seeking solutions to the dilemma. New Hampshire manages 250 miles of wheeled off-highway recreational vehicle (OHRV) trails throughout the state, including some on state lands. State law restricts OHRVs from driving through wetlands and surface waters. In Vermont, ATVs are prohibited on state lands, although a collaborative group convened by the governor has recently proposed development of trail links across state land to networks on private land. The states should be very careful in making the decision to open up public lands to this kind of motorized recreation and to develop such trails on private lands, despite public pressure to do so.

In New Hampshire, town officials and landowners should contact the Fish and Game Department if a problem occurs, and should make their concerns known to their legislators. Because Fish and Game does not have the manpower to enforce responsible riding, it is now making grants to towns to help them take over enforcement responsibility, although few towns have the ability to assume this role.

It would appear that the best way to handle the increasing demand for ATV trails is to designate limited special areas for them, where water stays on site and trail erosion cannot contribute to water quality degradation. A mandatory registration fee should be large enough to provide funds for law enforcement, trail construction, and a landowner restitution fund to which landowners can apply for reimbursement if they have sustained damage from OHRVs.

Snowmobile clubs present a good model for ATV riders. Boaters, drivers, and snowmobilers are required to pass a safety education course, and there should be a similar requirement for ATV riders. ATV insurance should be mandatory for all riders, as it already is for Vermont snowmobiles.

RECOMMENDATIONS

- State recreation agencies should consider designating limited special areas for ATV trails and require that their design, construction, and maintenance are consistent with state and local planning and zoning, that water stays on site and trail erosion does not contribute to water quality degradation. Proposed ATV trails on state lands should be developed only after ample public discussion, and only if the responsible state agency can adequately monitor the trails, with active cooperation from a local club. The states should encourage joint rides with conservationists as trails are established, to point out areas to avoid.
- The NH Legislature should provide more funding to NH Fish & Game to allow it to fulfill its responsibility for enforcement of OHRV laws, and enact legislation to create a framework for responsible use of ATVs.
- Private landowners should be educated about the effects of allowing trails over streams and up steep hills on their land.
- Equipment dealers should encourage appropriate use of trails by not promoting the kinds of irresponsible

behavior shown in manufacturers' advertisements.

- Riders should be required to be members of a statewide ATV organization, which would provide education and training.
- State recreation agencies should establish a mandatory registration fee for ATVs that is large enough to provide funds for law enforcement and trail construction; dedicate part of the fee to a landowner restitution fund to which landowners can apply for reimbursement if they have sustained damage from OHRVs.
- State recreation agencies should require completion of a course and mandatory ATV insurance.

Winter recreation

In a region that an artful New Englander once said "offers six months of winter and six months of poor sledding," there are just as many opportunities for snowbound outdoor recreation in the Upper Valley as there are in warmer months. Many local groups offer snowshoe walks and winter hikes. The Hulbert Outdoor Center in Fairlee hosts an annual winter festival on Lake Morey, and the Dartmouth Winter Carnival is a long-standing tradition. The Montshire Museum holds an annual igloo-building event.

Upper Valley people enjoy skiing in all its forms. Cross-country skiers glide on miles of groomed trails at Dartmouth College's Hanover Country Club and Oak Hill in Hanover and at Thetford Hill State Park, or explore extensive trail systems on conserved public and private land. Downhill skiers gather at the Dartmouth Skiway in Lyme or at Lebanon's Storrs Hill, a few blocks from downtown. The Ford Sayre ski program offers recreational and competition-level race training for area youth. Some local towns also have their own school ski programs.

Snowshoeing on open fields or on woods trails is a favorite form of outdoor recreation. Dog sledding, skijoring, and other relatively new winter sports are becoming more popular in the area, and dog sled competitions have been held in several Upper Valley towns. Pond skating remains an old fashioned favorite on farm ponds and natural ponds dotting the region. Ice fishermen populate larger ponds and river setbacks.

There is active interest among many Upper Valley landowners in building cross-country ski trails. In general, ski trails are wider than summer foot trails, and are cleared to a width of 12' to catch snow. This design may not be appropriate in all settings because it can make a trail more susceptible to erosion and can create edge habitat in the forest. Riparian buffers should be protected during trail construction.

Snowmobiling is a long-established winter way of life for many, and there are well-coordinated and managed trail systems linking most towns, through the efforts of local snowmobile clubs on both sides of the river. Agreements with private landowners allow passage during the winter season, but not generally for dry land use by the public. Many of these trails bring riders and business to local stores and eateries. Cross-country skiers and snowmobiles now share trails in most places with little or no conflict, due to both groups' care in observing trail etiquette. Continued good relations require on-going effort. Moving to quieter, more efficient four-cycle engines will improve air quality and further reduce conflicts.

Nordic skating has gained interest in the Upper Valley, and Lake Morey has the country's longest Nordic skating track. Distance skaters sometimes use the Connecticut River. They should approach this activity with great caution. On the Connecticut River and its setbacks, ice thickness can vary greatly within a few feet, depending upon whether there is a spring below, or where the current is active. In the impoundment behind Wilder Dam, the water level continues to fluctuate unpredictably, even though the ice cover above it appears solid. There may be several feet of empty space between the bottom of the ice and the top of the water.

As with hiking trails, snowmobile trails and the private land they cross deserve attention and care during sensitive times of the year. Snowmobiling on the river is not safe.

RECOMMENDATIONS

- Snowmobile clubs should enforce the rules on trail travel under erosion-prone conditions and discourage their members from riding on the river. Encourage riders to move to four-cycle engines.
- Recreationists should ask permission to use trails on private land.
- Ice fishermen should be certain to replace their lead

Ice safety: Those hoping to venture on to the ice should check it first. The Cold Regions Research and Engineering Laboratory in Hanover recommends this rule of thumb for new, clear ice: a minimum of:

- 4 - 6 inches of ice to support a few well-dispersed people;
- 6 - 7 inches for small, on-foot, group activities;
- at least 8 - 10 inches for snowmobile activities. A wise precaution is to carry a long stick to help distribute weight or to lay across a hole in an emergency. If ice at the shore is cracked or soft, stay off. Avoid ice during thaws. Avoid honeycombed ice, dark snow and dark ice, and look for settling ice against the shore. Ice is generally thinner where there is moving water, such as at inlets and outlets, around bridge abutments, islands and objects protruding through the ice. Coves are generally safer than the river mainstem.

tackle with safer equipment and remove their bob houses well before the ice breaks up in spring.

CONNECTICUT RIVER BYWAY

The river corridor has been a popular route for auto touring since the invention of the Sunday drive. The Connecticut River Byway was designated a National Scenic Byway in 2005. In 1999, the States of New Hampshire and Vermont designated the Byway routes along the river, after the Connecticut River Joint Commissions worked with the states and regional planning agencies on a feasibility study and implementation plan for a scenic byway in the Valley. Each town was given the opportunity to decide whether to participate. In the Upper Valley region, the Byway follows Routes 5 (Vermont) and 10 and 12A (New Hampshire), visiting the historic villages, scenic river overlooks, and Dartmouth College along the way.

CRJC sponsors the Connecticut River Byway Council to balance the promotion, preservation, enjoyment, and stewardship of the Connecticut River Valley. The Council pursues preservation of scenic, cultural, and recreational features, and development of the infrastructure of signage and other information that will enable visitors, whether from the next town or from across the country, to enjoy and explore the Valley. Membership in the Byway Council is open to all. Its steering committee has balanced representation from municipalities, regional planning agencies, chambers of commerce, cultural and natural resource organizations, the agricultural community, and state agencies.

The Byway represents a custom-made opportunity for regional economic development based upon the features that set our valley apart: fine and varied river recreation, scenic beauty, tangible history, and a rich agricultural heritage. The Byway also provides an economic reason to pursue protection of the values that give the region its appeal: the extraordinary combination of historic buildings, covered bridges, scenic farmland, and a clean environment. Scenic views along the Byway are being inventoried to help towns and conservation organizations prioritize their protection.

Waypoint communities - A number of communities along the 500-mile-long Byway between Canada and the Massachusetts border have stepped forward to offer information and services to visitors. In the Upper Valley, the State of Vermont has opened a downtown visitor center in the White River Junction train station, sharing the history and appeal of this community and its neighbors. To be effective in interpreting the bi-state Byway, the Byway centers should provide information both sides of the Connecticut River.

RECOMMENDATIONS

- The Connecticut River Byway Council should help educate new residents and visitors to the region on respectful use of private land, such as asking landowner permission and avoiding littering. The Council should assist efforts already underway by area land trusts to conserve scenic views, including riverfront lands. The Byway Council should encourage inn-to-inn canoe trips for their commercial value to local inn owners and to relieve pressure on the canoe campsite system.
- Waypoint centers should offer Connecticut River Birding Trail guides and ValleyQuest publications, and provide information about and directions to places of interest on both sides of the Connecticut River, not just those located within the same state.
- State transportation agencies should provide limited signage identifying waterways that is aesthetically in keeping with the rural nature of the region.
- Upper Valley towns should take action to protect scenic views if they have not already done so.

OTHER UPPER VALLEY RECREATIONAL OPPORTUNITIES

Annual events

The Upper Valley is the setting for a number of annual land- and water-based events, some of them aimed at offering good family fun around the region's defining natural feature, and others using it as a platform to encourage public health. Connecticut RiverFest has sponsored a day-long river celebration and family event at TransCanada's property in Wilder. The Lower Cohase Region Chamber of Commerce has begun a tradition of an annual "Paddle the Border" in the northern part of the Upper Valley reach. For the last five years, West Central Behavioral Health has hosted "Paddlepower," a 36 mile trip down the Connecticut River to raise funds and awareness aimed at suicide prevention. For nearly three decades, the Annual Prouty Century Bike Ride has sent teams of bicyclists on 25, 50, and even 100 mile rides up and down the Connecticut River as a fund raiser for Dartmouth's Norris Cotton Cancer Center, in a summer event that now involves some 4,000 people.

Municipal recreation

Many Upper Valley communities have established their own recreation commissions or committees. Some, such as Hanover, Lebanon, and Hartford, have paid staffs. In other towns, such as Lyme, Fairlee, Norwich, Bradford, and

Orford, volunteers serve on a committee that manages local celebrations and events. Some include their town's rivers in the recreation calendar, others do not.

Recreational facilities near the river

As the Upper Valley's population continues to grow, interest in built recreational facilities and playing fields will likely follow. Towns and developers should keep the river in mind when designing recreation projects nearby. Any development of this kind along the river deserves very close scrutiny, due to associated impacts of stormwater, access roads, parking lots, landscaping, and lighting.

Three public golf courses abut the river, in Bradford, Hanover, and Lebanon, and another operates in the corridor in Fairlee. Golf courses can have a significant effect upon water quality.

RECOMMENDATIONS

- Upper Valley towns should define "recreational facilities" in their zoning ordinances, to allow them to better guide these developments particularly along waterways. They should closely review any development of recreational facilities along the river. Parking areas should be limited in size and set far from the river, screened from both the river and nearby roads with a deep buffer of native vegetation. They should be built of permeable materials. Plans should incorporate the principles of low impact design and protect the riparian buffer.
- Towns should discourage construction of public and private beaches along the river because of the negative impact of imported sand and removal of the riparian buffer on water quality.
- Golf course managers using Connecticut River water for irrigation should register this water use with the State of New Hampshire. Golf courses should apply best management practices for fertilizer and pesticide use, and integrate bio-retention and other low impact stormwater management principles in their design.

Recreation Areas of the U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers owns and manages 983 acres at the Union Village Dam on the Ompompanoosuc River in Thetford. In addition to the flood control dam and its 740-acre lake, the property includes interpretive hiking trails through the largely forested property. This is a large, very busy recreational area that is highly valued. More than 21,000 visitors use the area for picnicking, swimming, hiking, fishing, hunting, cross-country skiing, and snowmobiling each year. The Corps also sponsors public education programs, both on site and off. Heavy foot traffic areas such as picnic sites are currently in need of restoration.

The Corps also owns property at Quechee Gorge, and has co-sponsored construction of a visitor center on the Ottauquechee River in the town of Hartford. This, with trails to the river on property owned by the Vermont Institute of Natural Science, offer an excellent opportunity for visitors and residents to enjoy and learn about the river environment.

RECOMMENDATIONS

- U.S. Army Corps of Engineers should work with the town of Thetford in plans for recreational use of its property at the Union Village Dam.
- The Corps should repair erosion from heavy foot traffic at picnic areas at the Union Village Dam and Quechee Gorge.

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