

PART FIVE: PUBLIC HEALTH RELATED ASSESSMENTS

Size of Water Affected by Toxicants

With the exception of fish consumption advisories described in Appendix D, there are no waterbodies where toxicants are known to be impairing uses related to public health. Nonetheless, NPDES monitoring and water supply monitoring continue to provide data and other information related to environmental occurrences of toxicants in permitted municipal and industrial discharges and public water supplies, respectively.

Fish Consumption Monitoring

During the reporting period, approximately 150 individual fishes were acquired from Lake Champlain waters for the purpose of revising fish consumption advisories. Samples composited from these fishes are presently undergoing analysis in the DEC LaRosa Laboratory located in Waterbury. DEC is interested in testing a subset of fishes for polybrominated diphenyl ether flame retardants and has approached EPA for potential assistance in this regard. In addition, DEC scientists have provided testimony to Vermont legislative committees regarding formalization of fish tissue monitoring approaches. Ideally, a modified tissue monitoring program for all Vermont waters would incorporate new scientific findings from New England and elsewhere and identify waters where the public can have greater confidence over consumption of freshwater fishes with lesser risk of ingesting mercury.

Mercury Monitoring

The following text summarizes monitoring and analytical activities related to mercury contamination in Vermont during the 2004 305b reporting period (1/1/02 to 12/31/03). Some of these items are not specifically from Vermont, but all bear on Vermont's future approach to dealing with the mercury problem. The reader is also directed to Part 4.D.5 appearing earlier in this report for information regarding a probabilistic survey of mercury contamination.

Underhill Mercury Monitoring Station

Through the efforts of EPA, the University of Vermont, the Vermont Monitoring Cooperative, and Vermont's senatorial delegation, funding appears stable for an additional five years of atmospheric mercury monitoring at Underhill, Vermont. This world-class monitoring station is the longest running mercury monitoring site in the world.

Vermont Mercury Emissions Inventory

DEC has recently completed revisions to the statewide mercury emissions inventory. Vermont's emissions are the lowest of all New England states.

Lake Champlain

St. Lawrence University is continuing to refine its model of mercury accumulation in Lake Champlain. This model will be useful to determine the influence of changes in atmospheric deposition rates and wastewater discharges on the concentrations of mercury in the lake's waters. This is a joint project between St. Lawrence University, USGS and DEC.

United States Geological Survey (USGS)

The USGS continues to actively monitor mercury in selected Vermont watersheds. The newest research findings indicate that upland areas of small streams may be important areas for the methylation (toxification) of mercury. This is a new finding which may bear national relevance. For 2004, USGS will place more of its mercury monitoring emphasis on Lake Champlain.

Vermont Institute of Natural Sciences (VINS)

VINS is presently making measurements of mercury in the blood of the threatened Bicknell's thrush, an insectivorous neo-tropical bird of high elevation mountainous forests. Results of this work suggest that mercury in these birds is elevated in some sites and that the birds acquire additional mercury burdens as they age. This indicates that the mercury problem is not limited to aquatic environments. The purpose of this work is to establish an upland biological indicator of mercury contamination.

Southeast New Hampshire Mercury Hotspot

Southeast New Hampshire is a known mercury hotspot. The region is surrounded by several municipal waste combustors and coal-burning power plants. Recent monitoring of fish and loon tissues in this region indicate that fishes and loons there are among the Nation's most contaminated by mercury. Routine annual measurements of mercury in loons have, however, shown a decline in contamination, coincident with the mercury reductions from municipal and medical waste combustion. The levels of contamination in this area are still too high, and controls on the nearby coal-fired plants in New Hampshire and Massachusetts will be necessary to restore this area.

Paleolimnological studies

New data available from lakes in and near southern Vermont indicate that: 1) the declines in mercury delivered to sediments appear to hold in this geographically focused study area; 2) accumulation in these lakes may be as much as four times that of the VT-NH lakes previously sampled and reported in Vermont; 3) a core from a reservoir near Albany shows world-class mercury contamination. The source of the enhanced mercury delivery to southern Vermont and of the elevated concentrations in sediments near Albany may be attributable to the presence of a mercury recycling facility in the Albany, New York area called MARECO. New sediment core results are also available from three Lake Champlain segments. These cores indicate that while the source of mercury to Lake Champlain is largely atmospheric, this mercury is highly processed by the lakes large watershed. Land disturbance events are well reflected by "spikes" in mercury accumulation to lake sediments in all three segments tested.

EPA Fish Tissue Criterion

In 2001, EPA promulgated a new fish tissue criterion under Section 304a of the Clean Water Act. States are required by this section of the Act to either adopt the EPA recommended criteria, or to propose criteria that are more stringent, to be adopted into the state's Water Quality Standards. Vermont has not yet adopted a specific criterion for mercury.

Wildlife Criterion Value for Mercury

The State of Maine is actively developing a wildlife criterion value (WCV) to protect wildlife from mercury they consume through the food web. A WCV is essentially a water-column

mercury concentration above which fish are expected to bioaccumulate mercury to levels above those considered safe for humans and wildlife that consume the fish. Maine's WCV, to be formally promulgated in March 2004, is expected to be approximately one-tenth Vermont's current most conservative criterion. Vermont should keep apprised of the work being done in Maine, as it may provide a suitable and simple approach to managing mercury in Vermont waters.

Analytical Capacity

The DEC LaRosa Laboratory located in Waterbury now has the ability to perform relatively low-level mercury analyses in waters. The current method detection limit for mercury is approximately 5 parts per trillion.

Cyanobacteria

During the summer of 2003, the University of Vermont, in collaboration with DEC and others, implemented a "Tiered Sampling and Analytical" monitoring program for assessing the occurrence of potentially toxic cyanobacteria and associated toxins at selected locations in Lake Champlain. Results of weekly sampling were distributed immediately to stakeholders, including health agencies in New York, Vermont and Quebec. The intent of the program was to coordinate data gathering efforts and to provide real time information that would be useful in formulating management response to occurrences of potential toxic cyanobacteria blooms. Monitoring and data updates continued through September along with the decline of significant concentrations of cyanobacteria in the Lake. In late August, microcystin levels at several locations on Mississquoi Bay exceeded 1 ug/l, resulting in the release of health alert notices suggesting that activities be restricted in those areas where cyanobacteria blooms are intense. By mid-September, microcystin levels had fallen to less than 1 ug/l. The monitoring and communication network was successful in generating and distributing relevant cyanobacterial information in an efficient and timely manner, allowing for appropriate management responses. Planning for 2004 activities is in progress. In addition, researchers at the University of Vermont with funding from their Water Resources Research Center, are investigating the use of satellite images for providing real time information on the status of cyanobacterial populations in Vermont surface waters. This investigation is ongoing.

Small Community Untreated Waste Discharges

Several small communities throughout the state have been discharging untreated wastes to waters of the state due to lack of treatment facilities. The discharges from these areas constitute threats to public health. The villages of Shoreham and Cabot have completed the construction of their wastewater treatment facilities and both surface discharging facilities are now fully operational. The villages of East St. Johnsbury, Pownal and Warren have completed their planning and design work for pollution abatement facilities during this reporting period. Warren Village began construction of its indirect discharge project in 2003 and will complete it in 2004. The villages of East St. Johnsbury and Pownal will begin construction of their indirect and surface discharging systems, respectively, in 2004.

DEC is providing direct funding and technical assistance to several other communities to help them evaluate and plan for their wastewater needs. It is anticipated there will be a steady demand by several small communities for wastewater evaluations and planning in the coming years. These communities have not been identified in the past as being the sources of surface water pollution, but residents are now realizing that they may have problems with their small lot and older on-site sewage systems. Part of the impetus for this interest appears to be a change in state law which will require designs and permits for all failed septic system repairs beginning in 2007. Currently, repairs at single family houses require no permitting or compliance with design standards.

Sites of Known Sediment Contamination

The remediation of contaminated sediments at the Lake Memphremagog-South Bay railyard site in Newport, Vermont is complete.

Risk assessment activities are being conducted by EPA in regard to elevated contaminant levels found in sediments in and around the confluence of the Ompompanoosuc River with the Connecticut River. Contaminants are thought to be related to historical mining activities (but no longer occurring) at certain locations within the Ompompanoosuc watershed. The Elizabeth Mine site in Strafford is undergoing remediation.

Sediment testing in the Hoosic River has found PCB concentrations up to 0.041 mg/kg. The sediments tested are in the vicinity of the former Pownal tannery. Sediment sampling on the Hoosic River upstream in Massachusetts also found PCBs as well as a number of metals.

Hewitt Brook and Pond B at the old Bennington landfill site were analyzed for metals and PCBs. Twenty sediment samples were taken. Five metals were found at concentrations above the Low Effects Level (LEL). Arsenic was found at three sample locations above the Severe Effects Level (SEL). PCB concentrations were above the LEL in 14 of the 20 sediment samples. Monitoring is continuing at this site.

A number of compounds have been found in the sediments of Stevens Brook in St. Albans. Near the former St. Albans Gas & Light Property, one volatile organic compound, eight semi-volatile organic compounds, and four inorganics (cadmium, cyanide, barium, and zinc) were found in the sediments at three times or more the reference value.

Arsenic has been found in the sediments of Jewell Brook, a tributary to the upper Black River in Ludlow. Further investigation of the Jewell Brook Mill site is being conducted by DEC and others.

Restrictions on Bathing Areas During 2004 Reporting Period

Lake Champlain

Bayside Beach (Colchester) was closed on several occasions during the reporting period due to the presence of indicator bacteria in excess of Vermont's standard of 77 *E. coli* / 100ml. In the Burlington area, two beaches were closed once during the reporting period (Leddy and Oakledge beaches), and one beach (North Beach) was closed twice.

The beaches at Grand Isle and at Knight Point Vermont State Parks were both closed on two separate occasions during the reporting period.

These six Lake Champlain beaches noted above were re-opened for bathing after closure when follow up monitoring revealed safe levels of indicator bacteria.

Blanchard Beach (Burlington) continues to remain closed to swimming.

Inland Lakes

The following five inland lake beaches, located at the respective Vermont State Park, were closed on one or more occasions during the reporting period:

Lake Bomoseen:	1 closure	Lake Carmi:	5 closures
Crystal Lake:	2 closures	Lake Elmore:	3 closures
Shaftsbury Lake:	2 closures		

Each one of these beaches re-opened for bathing after closure when follow up monitoring revealed safe levels of indicator bacteria.

The following 3 inland reservoir beaches, located at facilities owned and operated by the US Army Corps of Engineers, were reported as closed for swimming (expressed as estimated number of days) during the reporting period:

<u>Facility Name</u>	<u>10/1/02-9/30/03</u>	<u>10/1/01-9/30/02</u>
Ball Mountain Lake	8	0
Townsend Lake	4	0
Union Village Dam	30	37

With the exception of one facility, each Army Corps beach was re-opened after closure when follow up monitoring revealed safe levels of indicator bacteria. At Union Village Dam, when a sample collected after Labor Day 2003 also exceeded standards, the beach there was closed for the remainder of the bathing season.

Restrictions on Surface Drinking Water Supplies During 2004 Reporting Period

There are two restrictions to report. The first is a standing boil water notice issued for users of the Allen Point water treatment supply system that draws its water from Malletts Bay of Lake Champlain. The second restriction is a standing boil water notice affecting several homes that are connected to the Montpelier City Water Treatment distribution system but are located upstream of the water treatment facility, effectively drawing untreated water as it is piped to the treatment facility. This water is drawn from Berlin Pond in Berlin, Vermont.

Chronic or Recurring Fish Kills

There were no known chronic or recurring fish kills in Vermont during the reporting period, save the commonly observed, natural mortality associated with post-spawning stress. Such fish mortality often occurs on lakes and ponds in Vermont during late spring and early summer. The Vermont Department of Fish and Wildlife maintains a fish pathology laboratory which responds to reports of fish kills.

During the reporting period, however, there were three fish kills documented by the fish pathology laboratory that were more than incidental magnitude and exceeded typical mortality associated with post-spawning stress. These three fish kills and details are as follows:

- 1) Lake Champlain-Inland Sea. June through July 2002. Moderate mortality was observed, largely on small yellow perch. This fish kill occurred during a period of maximum thermal change in the lake during a very hot spell in the beginning of the summer. According to the fish pathology laboratory, mortality was attributed to a combination of spawning stress, potential low dissolved oxygen, water temperature changes and secondary bacterial infection by the organism *Columnaris sp.* (Note: monitoring data from one Lake Champlain-Inland Sea monitoring station does not support dissolved oxygen as a cause of the mortality).
- 2) Dead Creek in Addison-Panton. July 2002. Low mortality was observed, mostly to carp. The fish pathology laboratory attributed this mortality to low dissolved oxygen in this vast wetland system and to post-spawning stress.
- 3) Gunner Brook in Barre. October 4, 2002. An illegal discharge of ammonia caused a high mortality event affecting many fish species. This event is currently under investigation by the Enforcement Division of the Vermont Agency of Natural Resources.