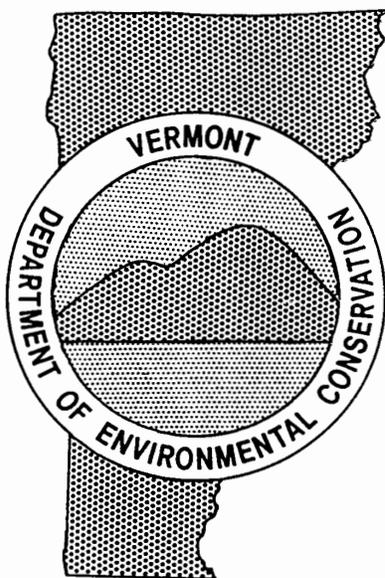


STATE OF VERMONT

1995

CONTINUING WATER QUALITY MANAGEMENT

PLANNING PROCESS



AGENCY OF NATURAL RESOURCES

**DEPARTMENT OF
ENVIRONMENTAL CONSERVATION**

**WATER QUALITY DIVISION
WATERBURY, VERMONT**

STATE OF VERMONT

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Waterbury, Vermont 05671-0408
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ADDITIONAL DEPARTMENT DOCUMENTS UTILIZED IN THE CONTINUING PLANNING PROCESS

The following is a listing of policies, rules and procedures referenced in the Continuing Planning Process which are utilized in preparing water quality management plans, permits and Conditional Use Determinations. They are not included in this document, but are available from the Department of Environmental Conservation upon request.

- Phosphorus Reduction Plan. 1990.
- FY94 Pollution Control Project Priority List
- Draft Toxic Discharge Control Strategy. 1994.
- Chlorine Policy. 1988.
- Interagency Policy on Land Application of Solid Waste. 1992.
- Indirect Discharge Rules. 1990.
- EPA Nonattainment Source List
- Summary of Section 208 Nonpoint Source Pollution Control Plans
- Memorandum of Understanding Regarding Agricultural Nonpoint Source Control. 1993.
- Agency Procedure For Determining Acceptable Minimum Stream Flows. 1993, and Agency of Natural Resources Procedure for Determining Conservation Flows. 1994.
- Wetland Rules. 1990.
- Road Salt & Salted Sand Storage Guideline & Snow Dumping & Vermont's Water Resources. 1993.
- Ground Water Protection Rule and Strategy. 1988.
- Solid Waste Management Rules. 1994.
- Combined Sewer Overflow Policy

I. DESCRIPTION OF THE CONTINUING WATER QUALITY MANAGEMENT PLANNING PROCESS

The Continuing Water Quality Management Planning Process (often referred to as the CPP) summarizes the documents, processes, policies, and programs used to protect and manage the quality of Vermont's waters. The Process guides the direction, approach, strategies and organization for the creation, modification and implementation of water quality management plans and programs to manage and protect Vermont's waters in the public interest. Individuals interested in obtaining additional detail concerning any of the programs contained in this document are encouraged to contact the Department.

II. BACKGROUND

The Federal Water Pollution Control Act, P.L. 92-500, and the subsequent amendments (hereafter referred to as the Act), requires in Section 303(e) that each state have a continuing planning process approved by the administrator and that such continuing planning process shall result in:

- a. the process for developing effluent limitations and schedules at least as stringent as those in the Act;
- b. the process for the incorporation of all elements of any applicable area - wide waste management plan prepared under Section 208 of the Act;
- c. the process for developing total maximum daily pollutant loads (TMDLs) and individual water quality based effluent limitations for pollutants in accordance with Section 303(d) of the Act and 40 CFR;
- d. the process for updating and maintaining water quality management plans (WQM) including schedules for revision;
- e. the process for assuring that adequate authority for intergovernmental cooperation in the implementation of the state WQM program;
- f. the process for establishing and assuring adequate implementation of new or revised water quality standards, including schedules of compliance, under section 303(c) of the Act;
- g. the process for assuring adequate controls over the disposition of all residual wastes from any water treatment processing;

- h. the process for developing an inventory and ranking, in order of priority of needs for construction of waste treatment works required to meet the applicable requirements of sections 301 and 302 of the Act;
- i. the process for determining the priority of permit issuance.

The first State of Vermont Continuing Water Quality Management Planning Process was approved by the U.S. Environmental Protection Agency (EPA) in January 1974. It was subsequently replaced by the "State of Vermont Continuing Water Quality Management Planning Process" dated April 1978 and approved by the U.S. EPA on July 3, 1978. This document was amended in July 1981 and formally adopted as a rule under the Vermont administrative procedures act, 3 V.S.A., Chapter 25. The CPP as then adopted included the "Description of the State Project Priority System" which established the procedures used to determine which municipal pollution abatement projects would be funded from federal and state funds.

The December 1984 and November 1988 revisions of the CPP were not formally adopted as rules under the Administrative Procedures Act nor will this revision be adopted as a rule. The CPP is considered to be a descriptive rather than a legal document. As a descriptive document, it will provide the reader with an overview of how the management of Vermont's waters is carried out.

The "Municipal Water Pollution Control Project Priority System" must continue to be a rule under 3 V.S.A., Chapter 25. If any revisions to it are necessary, it will be amended and readopted as a rule separately from the CPP.

Title 3, Chapter 51, §2825 gives the Secretary of the Agency of Natural Resources (ANR) adequate authority to provide for inter-governmental cooperation. This section states that the secretary's primary duties "... are to coordinate the activities of the various departments and divisions of the agency for the proper development, management and preservation of Vermont's natural resources..."

The ANR and Department of Environmental Conservation (Department) organization charts are included as Appendix A to aid the reader in understanding where various planning and program responsibilities lie.

III. DESCRIPTION OF THE CONTINUING WATER QUALITY MANAGEMENT PLANNING PROCESS COMPONENTS AND RELATED PROGRAMS

The Department of Environmental Conservation is the state agency responsible for water quality management planning in Vermont. Specific divisions of the Department take the lead in assuring that certain elements of the Vermont CPP are prepared, updated, and implemented. This section of the CPP briefly states the purpose

and describes each of the plan elements or programs which comprise the Vermont Continuing Water Quality Management Planning Process.

A. Vermont Water Quality Standards, Water Classifications, The Vermont Anti-Degradation Implementation Procedure & The NPDES Direct Discharge Application Procedure

The Vermont Water Quality Standards are the foundation for the State's water pollution control and water quality protection efforts. The Standards provide the specific criteria and policies for the management and protection of Vermont's surface waters. The classification of waters as Class A, Class B or Class B with Waste Management Zone (WMZ) are the management goals to be attained, if not already attained, which are necessary to protect the designated water uses for each class.

The Water Resources Board, a five-member citizen board, is responsible for adopting the Vermont Water Quality Standards and for classification of any waters as may be necessary in the public interest as authorized in 10 V.S.A., §1253. The current standards became effective on August 1, 1994. (Appendix B)

Reclassification of waters as Class A, Class B, or Class B with Waste Management zone is also a responsibility of the Water Resources Board. On its own motion or in response to a petition by a state agency, a municipality or any person in interest alleging that it or they suffer injustice or inequity as the result of the classification of any waters, the Water Resources Board must hold public hearings and, if found to be in the public interest, reclassify the waters in question. Numerous classification and reclassification orders covering the entire state have been promulgated by the Water Resources Board since the late 1950s.

Recent legislation modified the classification system which established Class C Zones. The Class C designation has been eliminated. The former Class C Zones are now Waste Management Zones, or .."specific reaches of Class B waters designated by permit to accept the discharge of properly treated wastes that prior to treatment contained organisms pathenogenic to human beings." WMZs must be managed as Class B waters. All unused WMZs, or those which do not have permitted treated waste discharges to them, will be automatically eliminated by July 1, 1997, provided no municipalities qualify for discharge permits to them. The legislation also requires the Department to "adjust the size of the WMZ to the extent necessary to accommodate the authorized discharge" as waste treatment facilities' permits come up for renewal. The WMZ length determination model is presently under development. Until it is developed, the "Class C Zone Length Determination Model" is being used.

The "Vermont Anti-Degradation Policy" is included as Section 1-03 of the "Vermont Water Quality Standards" and is intended to: protect the level of water quality that is better than the minimum criteria of the "Vermont Water Quality Standards;"

protect existing uses; and to determine the degree of water quality improvement that is in the public interest. Documentation of the public interest through the surface water classification system or one of the other public processes is an important part of the "Vermont Anti-Degradation Implementation Procedure" (Appendix C).

Another important way the "Vermont Anti-Degradation Implementation Procedure" is implemented is through the recently-approved "NPDES Direct Discharge Permit Application Procedure." (Appendix D). One of the steps the Permit Procedure calls for is the investigation of alternatives to creating a direct discharge to surface waters.

B. Vermont State Clean Water Strategy

The Vermont State Clean Water Strategy (SCWS) is a public process which identifies and targets certain surface and ground water resources as impaired or threatened for water quality planning, management and protection purposes. Three steps were completed to develop the SCWS: 1) an assessment of ground and surface waters that have been impaired or threatened by point or nonpoint sources of pollution; 2) the targeting of high priority waters for restoration or protection and 3) the conversion of ideas and programs into strategically planned actions.

Since completion of the major assessment and targeting effort conducted in 1988 and 1989, Vermont's surface and ground water qualities have been assessed in 1990, 1992 and 1994 as part of the 305(b) reporting process in order to (1) identify additional impaired or threatened waters, (2) track progress in eliminating water quality problems or threats and (3) to identify deficiencies in water quality information which may serve as the basis for ongoing or future water quality data collection activities. The targeting process relied upon these assessments and public participation to identify 165 waterbodies (including four ground water resource areas) referred to as "Targeted-Impaired Waters" (Appendix E). A list of "Targeted-Threatened Waters" includes 138 high priority waterbodies (with six ground water areas). The lists of Targeted-Impaired Waters and Targeted-Threatened Waters were updated in 1993. In that iteration, technical level and program director level personnel evaluated the severity of water quality problems and examined whether their activities could be better coordinated to more efficiently address water quality use impairments and threats.

A program shift was undertaken in 1989 and 1991 by state and non-state agencies to fashion a genuinely coordinated strategy to deal with identified water quality problems. Program managers considered any adjustments to their respective programs by giving discretionary emphasis to problem resolution or threat abatement in high priority waters. Shifts in programming will ultimately achieve a more timely and coordinated approach towards resolving/avoiding the water quality problems identified in the listing of targeted waters.

C. Description of Base Programs

Vermont administers a well-planned and comprehensive water pollution control program, consisting of long term planning of municipal wastewater system needs, preliminary and final design engineering review and guidance. In addition, the program includes facility construction overview, construction grants and loans administration, permitting, operations and management overview, and compliance monitoring. With the completed construction of the last originally-identified sewage treatment plants, the remaining upgrades from primary to secondary and phosphorus removal, the program is shifting emphasis to advanced waste treatment, correction of combined sewer overflows (CSOs), construction of small wastewater treatment facilities to replace failing on-site systems, enlargement of existing sewage treatment plants and refurbishment of facilities that have reached their design life.

D. Vermont Discharge Permit Program

Vermont executed a memorandum of agreement with the U.S. Environmental Protection Agency on March 11, 1974, in which the Vermont Permit Program was accepted as equivalent to the National Pollutant Discharge Elimination System (NPDES) program defined in Section 402 of Public Law 92-500. Under that program, permits were issued to all qualifying municipal and non-municipal dischargers.

Amendments to Vermont's permit enabling law (10 V.S.A., Chapter 47, enacted in April 1973), provided for issuance of pretreatment permits to those discharges to publicly owned treatment works whose waste would interfere with the treatment process, pass through without treatment, or otherwise be injurious to receiving water quality. The Clean Water Act of 1977 carried similar authority and provided that a state's pretreatment permit program consistent with P.L. 95-217 could be accepted in lieu of a federally-operated program. The pretreatment portion of the Water Pollution Control Program was adopted by the State of Vermont in March, 1982 through a memorandum of agreement signed by the state and EPA.

Discharge permits issued to dischargers include monitoring schedules and reporting requirements necessary to insure that facility operation is as-designed and adequate to meet water quality standards. As permits are drafted or reissued, the Wastewater Management Division and the Water Quality Division coordinate their individual reviews through the previously-mentioned "NPDES Direct Discharge Permit Application Procedure" to assure that all draft permits are consistent with other permit requirements related to land use issues and to determine if a new or lengthened waste management zone is required, among other requirements. A notice of intent to issue a permit is sent to the appropriate town clerk and to others who are on the public notification list. If a hearing is requested and/or there is considerable interest, a public hearing may be held on the draft permit. Comments and testimony received are reviewed and the draft permit revised as needed before issuance or denial.

1. Municipal Facilities

Vermont has concluded construction of the historically - identified POTWs. In 1977, Vermont passed legislation which required point sources discharging to Lake Champlain to reduce their concentration of phosphorus to 1.0 mg/l. All POWs affected by this legislation have now met this requirement. Recent (1991 adjourned session) legislation requires certain POTWs which discharge to Lake Champlain or Lake Memphremagog or to other waters of the state which are designated by the secretary to reduce their concentration of phosphorus to 0.8 mg/l on a monthly average basis, on a schedule consistent with available funding. Further information on phosphorus reduction to the State's waters may be found in the "Phosphorus Reduction Plan," March 1990, available from the Department.

In June 1990, the Department finalized a CSO control policy which initiated a long-term program to abate pollution resulting from overflowing combined sanitary and storm sewers. As part of that policy, the Department compiled a comprehensive list of 26 municipalities and some 150 known or suspected CSO discharges. The Department is using the list to issue facility construction schedules to municipalities to treat or eliminate the combined sewer overflows.

The remaining pollution control work in Vermont includes the enlargement of existing treatment plants or construction of new plants as population growth requires or additional needs become known, and the incorporation of advanced waste treatment measures as needed to accommodate population growth or toxics removal. Also, remaining work includes refurbishment of aging facilities to enable them to continue to operate efficiently and meet the requirements of NPDES permits.

2. Industrial Facilities

Substantial progress has been made in Vermont by industrial dischargers and the impact of their discharges on the quality of their receiving waters, and on the operations of municipal treatment facilities which receive industrial discharges. The majority of industrial discharges in Vermont presently employ Best Practicable Treatment Technology. Pretreatment permit issuance continues to receive significant commitment on the part of the Department due to the large potential and actual effect of industrial wastes on Vermont's relatively small municipal facilities.

3. Permit Compliance and Enforcement

Compliance monitoring sampling by the Department serves to verify effluent data submitted by municipal and non-municipal dischargers. Permittees are considered major or minor dischargers based on volume and type of effluent. Major municipalities are those who discharge more than one million gallons per day, and minor municipalities are

those that discharge less. For non-municipal dischargers, Vermont uses EPA's rating system for designating major discharges.

An on-going responsibility of the Department is ensuring that the self-monitoring data being submitted to the Department by the permittees is accurate and representative of the actual discharge. This is accomplished by conducting on-site lab evaluations which review the analytical and sampling procedures, operability of critical lab equipment and the completeness of the back-up raw data sheets. EPA also requires that the major municipal facilities analyze an annual quality assurance (QA) sample as a check on the facilities' ability to correctly run the permit-required tests. A QA program has been proposed as part of the revised operator certification program. This program has been developed to help assure that the permit-required BOD, TSS and chlorine residual tests are being performed by competent and knowledgeable analysts.

The submitted self-monitoring data is reviewed by the Department's Wastewater Management Division and Operations and Management (O&M) Section. The Wastewater Management Division tracks compliance with the specific permit requirements while O&M reviews the process control data for trends which are indicative of developing process upsets, thereby possibly preventing future violations.

The Department's Significant Non-Compliance Policy contains criteria which are used to elevate non-complying facilities to a high level for Department attention. The Permits and O&M Sections and the Enforcement Division work together in deciding what approach should be taken with the more serious violators.

4. Operation, Maintenance and Training

Wastewater facilities must be properly operated and maintained by competent persons to maintain effluent quality. The Department provides a range of programs to improve compliance including: approximately 100 visits and detailed inspections per year, including compliance record review and recommendations to correct violations; compliance sampling of selected plants; technical assistance to define violation corrections and plant improvements; certification of about 360 operators; classroom training workshops in process control and laboratory procedure reaching over 200 industrial and domestic operators per year; review of proposed facilities to assure effluent limits can be met; Operations and Maintenance manual review, and financial management assistance to help municipalities identify and establish proper financial procedures.

The on-site operator training program has proved very successful in reducing the potential for effluent violations at a facility when there has been operator turnover. If the new chief operator is inexperienced, a member of the O&M Section will spend a substantial amount of time on-site with the new person, instructing him/her on process control and permit requirements.

A program initiated in 1992 is the Compliance Maintenance Program. The primary component of this voluntary program is the annual self-assessment form which each municipal chief operator is asked to fill out. Items covered by the form are a comparison of current and design loading figures, compliance records, budgetary issues, etc. A resulting index is used to predict the probability of future noncompliance and helps to direct the owners' energies to areas which may contribute to near term compliance problems. In this manner, the program helps to prevent noncompliance rather than having the Department react to noncompliance when it occurs.

5. Construction Grants, Loans and Revolving Funds

Vermont offers financial assistance to municipalities for planning and construction of pollution control facilities. Projects required to maintain water quality standards during dry weather sewage flows may consist of a 35% grant (Title 10 V.S.A. Section 1625) if this grant funding is combining with other state or federal grant funds, or a State Revolving Fund Loan (SRF - described below). Projects necessary to maintain water quality standards during wet weather sewage flows are eligible for a 25% grant and a 50% SRF loan (Title 10 V.S.A. Section 1624a).

The Vermont General Assembly established a State Revolving Fund (SRF) under Title 24 V.S.A. Chapter 120, which is administered cooperatively by the VT Municipal Bond Bank and the Department. The SRF consists of state and federal funds, awarded under Title VI of the federal Clean Water Act, and provides low interest loans to municipalities for construction of pollution control facilities. SRF loan funds are for a maximum of 20 years and interest rates are set by statute or by the VT State Treasurer to fall between 0% and 80% of the interest rate paid on state obligations. Loans of up to 100%, payable over 20 years, may also be made for non-CSO projects from the Vermont revolving loan fund or from the Vermont-EPA revolving fund, depending on project eligibility data. Interest-free loans for preliminary planning and final design engineering are available to municipalities (Subchapter 2 of Title 10 V.S.A., Chapter 55).

6. Municipal Water Pollution Control Project Priority System and Listing

In order to systematically distribute limited funds for municipal pollution abatement and to set priorities for distributing those funds, the Municipal Water Pollution Control Project Priority System and Listing have been developed. The Project Priority System has been adopted as a rule under the Administrative Procedures Act. The Project List is updated on an annual basis where completed projects are eliminated and new projects are added to the List. Before the List is finalized, its contents undergo a formal public hearing process. A copy of the Project Priority System is presented as Appendix F.

7. Wasteload Allocation Process

In cases where advanced waste treatment is necessary to meet the dissolved oxygen requirements of the Water Quality Standards, wasteload allocations are developed in three phases. First, intensive sampling of the river and discharges is performed. Second, mathematical modeling is done and alternative wasteload allocations are developed and presented to the public. Finally, the Secretary of ANR adopts the selected allocation.

The requirements and procedures for estimating assimilative capacity and development and adoption of a wasteload allocation are contained in a rule adopted in 1987. See Appendix G for a copy of this rule.

8. State Approved Municipal Wastewater Treatment Facility Planning and Construction

Preliminary engineering reports and final construction plans and specifications for facility construction are reviewed and approved by the Department. These planning efforts are normally funded through engineering planning loans administered by the Department pursuant to 10 V.S.A., Chapter 55. The Construction Section of the Public Facilities Division oversees the construction phase of the projects. Proposed plans are also reviewed to assure that the facility and its proposed discharge will meet water quality standards and conforms with any adopted wasteload allocations and river basin water quality management plans.

9. Toxic Control Program

The Department has developed a Toxic Discharge Control Strategy utilizing a progressively stringent three-tiered, data-development process to identify and quantify all toxic point discharges in Vermont. The Department has also developed a Chlorine Policy.

Tier I of the data-generation process serves as an initial screening of all existing discharges to waters of the State to identify those which are potentially toxic. Tier II data generation establishes the presence or absence of toxicity and provides at least a preliminary assessment of the magnitude of toxicity threat to the biota of the receiving water. Tier III data generation to be undertaken by the discharger, refines any uncertainty associated with the development of regulatory criteria. The refinement process will involve either increasing the intensity of toxic testing and expanding the chronic and definitive data base to include more test organism species, or reducing toxicity in the discharge through the implementation of toxicity reduction evaluation.

Tier I of the Toxic Discharge Control Strategy has been completed, resulting in a Priority Listing. The most recent water quality standards now contain numeric criteria for toxics.

10. Sludge Management

The State of Vermont certifies: 1) treatment of waste prior to land application, 2) storage (so that wastes are not land-spread during times of the year that might present an increased risk of ground or surface water contamination) and, 3) sites for spreading. Most important is the review and certification of a sludge or septage management strategy that proposes a means of managing a waste that is generated year-round, but cannot be land spread during the winter or during certain times when sites may not be suitable (e.g. after corn planting) for spreading. The septage and sludge management program may be the largest recycling effort on a statewide basis. An interagency policy endorsing the proper land management of these materials was recently authorized and is available from the Department.

A recent survey of municipal sludge management files revealed there are 186 areas (as fields) certified by the Department for sludge disposal throughout the state. there are 15 certifications (representing close to 52 field areas) in Vermont issued for septage disposal. Land application certificates are effective for up to five years.

Based on estimates of sludge and septage that will be generated in Vermont by the year 2,000, approximately 1,385 acres will be required to land manage all of the sludge generated; approximately 1,300 acres will be needed for land management of septage. These 2,685 acres represent approximately five percent of the suitable land available.

11. Indirect Discharge Permit Program

It is, and has been, the policy of the State of Vermont to limit the number of discharges to state surface waters and to insure that those discharges which are permitted meet strict standards which maintain water quality and protect the beneficial values and uses of the receiving waters. On May 16, 1986, the Vermont Water Pollution Control Act (10 V.S.A., Chapter 47) was amended to require permits for all discharges, either direct or indirect. An indirect discharge is any discharge to groundwater, whether subsurface, land based or otherwise. When wastes enter the groundwater and then flow below the ground surface to a nearby stream or other surface water, the impact of those wastes must be evaluated to insure compliance with the Vermont Water Quality Standards.

In addition to the requirement that indirect discharges comply with the Water Quality Standards, the 1986 revisions to the Vermont Water Pollution Control Act (hereinafter, the "Act") established special restrictions for Class A and Class B waters

and for indirect discharges of sewage from systems with a capacity of 6,500 gallons per day (gpd) or more:

- Most discharges of more than 1,000 gpd are prohibited in Class A waters.
- Direct discharges of wastes that, prior to treatment, contained organisms pathogenic to humans, are not allowed in Class A.
- Indirect discharges of sewage from systems of 6,500 gpd capacity or more must comply with statutory criteria which require reduction in risks to the public health and aquatic biota in Class B waters.

In order to determine compliance with the "statutory criteria," Indirect Discharge Rules were promulgated. The rules were adopted January 15, 1990 to establish standards and procedures which the Secretary uses in reviewing applications for indirect discharges subject to the jurisdiction of these rules (Contact the Department for a copy of the rules). The rules further implement the policies established in the Act and in the Vermont Ground Water Protection Act (10 V.S.A., Chapter 48). It is the purpose of these rules to insure that:

- A. Indirect discharges comply with the provisions of the Vermont Water Quality Standards.
- B. Indirect discharges and associated treatment and disposal systems are designed and constructed in a manner that will provide reliable protection of the public health, ground water, and surface water during operation and maintenance.
- C. New indirect discharges of sewage from systems with a capacity of 6,500 gpd or more:
 - 1. will not significantly alter the aquatic biota in the receiving waters,
 - 2. will not pose more than a negligible risk to the public health, and
 - 3. will be consistent with existing and potential beneficial uses of the waters.

The jurisdiction of these rules is fully described in Title 10 V.S.A., Chapter 47. In summary, these rules apply to all indirect discharges except for on site sewage disposal systems with less than 6,500 gpd capacity which are covered by the Environmental Protection Rules, effective September 10, 1982 and existing discharges of non-sewage waste.

E. Nonpoint Source Pollution Assessment and Management Program

The 1987 amendments to the federal Clean Water Act focused on the development and implementation of programs to control nonpoint sources of water

pollution. Nonpoint sources (NPS) of water pollution have been recognized as impediments to meeting the goals of the Act. A listing of categories and subcategories of point source and nonpoint source pollution recognized by EPA to result in nonattainment of water quality goals was developed by the Department.

The amendments represent a comprehensive revision of the Clean Water Act by mandating that a number of new state water pollution control initiatives be carried out.¹ Section 319, which provides the legal basis for implementation of NPS control programs, identifies the requirements which states must satisfy in order to qualify for assistance under the Act. Two documents were completed in 1988 by Vermont and were approved by the U.S. Environmental Protection Agency. They are the "Vermont Nonpoint Source Management Program" and the "Vermont Nonpoint Source Assessment."

The Assessment provided an analysis of the nature, extent, and effect of NPS pollution on the degree to which designated uses are either being supported or impaired. The Nonpoint Source Management Program provided an overview of the state's NPS control programs and control measures or Best Management Practices. The document indicated state intentions for addressing NPS problems (and point source problems) over a four-year period.

The 1988 Vermont NPS Management Program involved, for the first time, the process of "targeting," or identifying those water resources through out the state which would create the greatest public benefit from activities of protection or restoration. Targeting of surface waterbodies for the Vermont NPS Management Program included public participation and a comparative evaluation procedure using the following four considerations:

- the severity of the water quality impairment or problem;
- the degree to which a designated use or uses were impaired;
- the amount of public interest or support in solving the problem associated with that waterbody; and
- the public benefit if use or uses were restored.

Examples of public benefits that were considered in the procedure were numbers of people affected, health-related concerns, fish or wildlife resources and recreational activities. Contaminated ground water resource areas were prioritized according to risk expressed as a level of state program management activity.

Similar considerations were used to target high quality waters with existing threats. In this case, however, the potential for impairment, the type(s) of pollution

¹These new initiatives carry on non-point source control work authorized under Section 208 and P.L. 92-500 in the 1970's and early 1980's.

source and the level of public support in avoiding a water quality problem were used as ranking considerations.

Since completion of the major assessment and targeting effort conducted in 1988 and 1989, Vermont's surface and ground water quality has continued to be assessed (see the Vermont 1990, 1992 and 1994 Water Quality Assessments²) in order to : (1) identify additional impaired or threatened waters, (2) track progress in eliminating water quality problems or threats, and (3) to identify deficiencies in water quality information which may serve as the basis for ongoing or future water quality data collection activities.

The Vermont State Clean Water Strategy, first completed in 1989, described how the state would attempt to bias or focus NPS and point source implementation programs in an integrated fashion to efficiently address problems and threats in targeted areas. The 1993 Vermont State Clean Water Strategy describes the needs and directions of NPS management in Vermont which will attempt to resolve recurrent patterns of ground and surface water quality problems. Activities, or objectives, which have the highest priority over the next four years, have been developed to resolve the identified problems. Each annual work plan submitted by Vermont to EPA further describes activities selected for Clean Water Act funding in a particular year and includes cost estimates and responsible agencies or departments.

As part of the Nonpoint Source Management Program, a series of management program needs were identified. These program needs plus certain existing and/or recommended efforts are described below. Their associated action plans may be found in the "State Clean Water Strategy" prepared by the Department of Environmental Conservation in August, 1993.

1. Agricultural Land Runoff

Considerable progress has been made by agricultural operators in Vermont with the voluntary implementation of measures designed to control or reduce agricultural nonpoint source pollution. Agricultural runoff, such as soil erosion from cropland and agricultural waste, has been identified in the Vermont Nonpoint Source Assessment Report (1988) and in the 1988, 1990, and 1992 and 1994 305(b) Reports as the highest contributor to water use impairment in Vermont. Ground water contamination has resulted primarily from leaching of animal waste and the application of agri-chemicals. Existing Best Management Practice (BMP) standards need improvement to support state water quality standards. More economic and social encouragement is needed for farmers to use BMPs.

²Also known as the biennial 305(b) Report.

State legislation enacted in 1990 authorized the development of recommendations for a state agricultural NPS pollution reduction program. In 1992, the VT General Assembly directed the Secretary of the Vermont Agency of Natural Resources to delegate the state agricultural NPS pollution control program planning, implementation and regulation, to the extent compatible with federal requirements, to the Department of Agriculture, Food & Markets (DAF&M). A Memorandum of Understanding was adopted in April 1993 for these purposes.

The legislation also required the Commissioner of DAF&M to promulgate rules to define Acceptable Agricultural Practices (AAP) and Best Management Practices (BMP) in order to reduce the amount of pollutants entering waters of the state. All agricultural operators in Vermont are required to adopt and follow the AAPs. The MOU states that the "Implementation of the AAPs creates a rebuttable presumption of compliance with water quality standards and removes such practices from regulation under the provisions of Title 10 V.S.A. §1259(c), (d) and (e). The presumption that the use of AAPs in an individual instance or as a general practice complies with Vermont Water Quality Standards may be overcome by water quality data or results from a water quality study deemed conclusive by the Secretary."

The MOU requires the Commissioner of DAF&M, before April 16, 1995 to institute rule making to adopt BMPs and a method of implementing them, and that they shall be required "... when sufficient financial assistance is available, agricultural landowners/operators in watersheds identified by the Commissioners of DEC and DAF&M in basin plans and the most recent State Clean Water Strategy as failing to meet water quality standards or water uses due to agricultural pollution."

A legislative study committee will report to the 1994 (Adjourned) session of Legislature with proposed legislation for financial assistance to agricultural landowners/operators which will act in concert with available financial assistance through federal agricultural agencies such as the Natural Resource Conservation Service (formerly the Soil Conservation Service - SCS) and the Consolidated Farm Services Agency (formerly the Agricultural Soil and Stabilization Office - ASCS). Financial assistance would be for implementation of BMPs.

2. Erosion From Construction Sites

In the Vermont NPS Assessment Report (1988) and in the 1988, 1990 and 1992 305[b] Reports, siltation and turbidity from construction sites were ranked the fourth highest source of water use impairment. The 1994 305(b) Report listed siltation as the number one cause of water pollution, and land development was the sixth ranked source of pollution. Increased monitoring of construction sites is needed to ensure compliance with erosion control measures and surface water quality standards. Limited personnel and funding must be channeled to the highest priority waters first.

3. River Flow Regulation and Impoundment Impacts

Hydromodification is ranked as a major source of water use impairment in the Vermont Nonpoint Source Pollution Assessment. Low and fluctuating flows and de-watering of stream channels must be corrected by establishing minimum in-stream flow requirements. More monitoring of hydroelectric dam permits is needed to ensure compliance with permit conditions. Remaining free-flowing rivers must be assessed to determine which ones merit protection and which can be developed for hydropower generation without impacting uses.

The foundation of state statutes protecting the natural flow of rivers and streams in Vermont is that natural flows should be protected and maintained in the public interest. All reasonable alternatives to altering stream flow, plus water conservation measures should be thoroughly considered before actual reduction of the natural flow rate is permitted. Only when a comprehensive analysis of such measures is completed can a reasoned and rational balance be defined between legitimate but competing users of the stream.

The Agency of Natural Resources has adopted two minimum stream flow procedures. The first, entitled "Agency Procedure For Determining Acceptable Minimum Stream Flows," was adopted July 14, 1993. The intent of this procedure is to assure a consistent process is used in determining acceptable minimum stream flows when there are existing or potential competing uses of the water. The procedure is applicable to Agency determinations of acceptable stream flow, made pursuant to: a) permits issued under 10 V.S.A. Chapter 43 (Dams); b) issuance of water quality certificates pursuant to §401 of the Federal Clean Water Act and FERC licensing or relicensing actions; c) stream alteration permits or stream flow regulation under 10 V.S.A. Chapter 41; d) authorization by the Commissioner of Fish & Wildlife to obstruct streams pursuant to 10 V.S.A. §4607 and, e) positions taken before Act 250 district environmental commissions with respect to projects affecting stream flow.

The procedure calls for determinations to be made that assure the passage of adequate water to maintain fisheries interests, aesthetic qualities, recreational and potable water supply uses appropriate to the body of water in question. The basis for the procedure is that, in general, if minimum flows adequate to maintain fisheries interests are provided, then flows will be adequate to simultaneously maintain acceptable aesthetic qualities and recreational uses.

The second procedure, entitled "Procedure for Determining Conservation Flows: Specific Application To Snowmaking By Ski Areas," was adopted by the Agency March 4, 1994. This procedure as well as the previously-mentioned procedure, is guided by the overall policy which calls for the protection and enhancement of the quality, character and usefulness of its surface waters; the prevention of the degradation of high quality waters and the prevention, abatement or control of all activities harmful to water quality.

The snowmaking procedure is further guided by the policy to: a) assure the protection, maintenance, and restoration of the chemical, physical and biological water quality, including water quantity, necessary to sustain aquatic communities, stream functions, and recreational opportunities; b) help and provide for and enhance the competitive viability of its (Vermont's) ski industry, whose utilization of certain of the State's rivers and streams for snowmaking is necessary for the benefit of the public's commerce and recreation and, c) permit water withdrawal and the construction of storage ponds by the ski industry for snowmaking consistent with this policy and applicable laws and regulations.

4. Combined Sewer Overflows (CSO's)

As mentioned earlier, stormwater runoff during rainstorms causes an overflow of in 26 Vermont communities and some 150 known or suspected CSO discharges with the result that untreated sewage is allowed to spill to receiving waters, creating a public health hazard. Separation of the stormwater from the sewage by construction of new sanitary or stormwater lines is the solution in most cases; however, some plants may only need extra treatment measures during rainstorms.

In June 1990, Vermont finalized a CSO control policy which initiated a long-term program to abate pollution resulting from overflowing combined sanitary and storm sewer systems. The policy has established a mechanism for either elimination or treatment of CSO discharges which occur during a 24 hour, 2.5 inch rainfall event (known as the "design" storm). As part of that policy, Vermont compiled a comprehensive list of known or suspected CSO discharges. Vermont is using the list to issue facility construction schedules to municipalities to treat or eliminate the combined sewer overflows.

5. Eurasian Watermilfoil

Eurasian watermilfoil (Myriophyllum spicatum) is a non-native nuisance aquatic plant that can severely impact water uses in the lakes and ponds it has invaded, including the state's three largest lakes - Lake Champlain, Lake Memphremagog and Lake Bomoseen. Ninety-nine non-infested lakes and ponds having a surface area greater than 20 acres and an undetermined number of smaller waterbodies are at risk from infestation because they are within a 10 mile radius of an infested waterbody.

Although it is hoped that biological methods to control Eurasian watermilfoil will soon be a reality, preventing its spread is still the most effective control at this time. Public education efforts to control and prevent its spread must be increased, as well as the State's ability to detect new infestations in their early stages.

6. Lake Water Quality Threatened by Cumulative Impact of Land Use Activities in Watersheds

Lakes are particularly fragile ecosystems. In contrast with rivers, lakes accumulate pollutants in their water and sediments which may never flush out. Of particular concern is the accumulation of nutrients and sediments which hasten the eutrophication of the lake, eventually causing algae blooms, excessive aquatic plant growth, and decreased water clarity. Some lakes are already experiencing these problems; most lakes need to be protected from cumulative impacts in hopes of preventing water quality problems. The Lake and Watershed Protection Program should continue to be expanded and strengthened.

7. Silvicultural Erosion

Timber harvesting is widely scattered throughout the state. Approximately 1.6% of the commercial forest land (70,122 acres) experiences some type of harvesting annually. This percentage varies from year to year depending on markets and landowner motivation. Many of these operations are potential sources of soil erosion leading to turbidity and sedimentation of streams.

Performance standards, known as "Acceptable Management Practices (AMP) for Maintaining Water Quality on Logging Jobs in Vermont," were adopted and became effective August 15, 1987. These practices are based on guidelines in existence and applied for more than ten years. Workshops and one-on-one contact with loggers and landowners have been underway since their adoption. In addition, a memorandum of agreement between the Department of Forests, Parks and Recreation and the Enforcement Division of the Environmental Conservation Department and a working agreement with the Vermont Forests Products Association (VFPA) have been installed to carry out the performance standards. Significant reductions in reported violations and enforcement actions have been noted.

The 1990 report entitled "Impact Assessment of Timber Harvesting in Vermont," prepared by the University of Vermont, noted the AMPs pertaining to spacing (of waterbars and other diversion structures) "appeared to be excessive while others pertaining to stream crossings were ineffective in maintaining water quality." Apparently, specific practice prescriptions need evaluation and adjustment. Although over 300 loggers have received training with the AMPs, it is still necessary to continue educational efforts. These efforts should be targeted toward high priority watersheds as determined by potential water quality degradation and/or significant concentrations of observed or reported violations.

8. Atmospheric Deposition

Atmospheric deposition in Vermont, originating primarily from out-of-state sources, threatens the water quality of some lakes and rivers that have been identified as being sensitive to the effects of acidic precipitation. Atmospheric total nitrogen deposition (both wet and dry) has been estimated to be approximately 10 pounds per acre per year. Some lakes and rivers are already measurably affected. A long-term toxic atmospheric deposition monitoring program needs to be developed based on mid-Western studies showing significant pollutant loading rates and biomagnification. A national atmospheric deposition control policy is needed.

9. Land Disposal - Septic Systems

An Agency of Natural Resources report (June 1990) prepared for the General Assembly on subdivision, small water and sewage programs, concluded that the current method of regulating sewage disposal from single family homes is inadequate. The best of three alternative approaches to the current system of regulation (now shared by the state and towns) identified was the creation of wastewater and water supply management districts. The two other options for legislative consideration included: 1) rewriting the current regulations or developing a completely new subdivision program and 2) ending state interest in single family home water and sewage systems and passing those responsibilities to municipalities.

Although legislative elimination of the On-Site Program resulted in the loss of services to 108 On-Site member towns, the program continues to provide some assistance to all Vermont towns with developing sewage disposal ordinances and with administrative aspects of a locally based sewage disposal program (i.e. forms and applications, conditions for approval/denial, enforcement). The program also provides a design review service (includes new and existing systems, involving single family to small scale community systems) to fourteen towns in southern Vermont.

The On-Site Sewage Committee, created in early 1993, has identified several programmatic inadequacies regarding on-site sewage disposal and treatment and has developed corrective recommendations. A report by the committee was completed in December 1993 and contained short term as well as long term recommendations for action. The framework for a revised and improved program has been developed and is undergoing public review.

10. Land Disposal - Wastewater - Large Systems

The Vermont Water Pollution Control Act (10 VSA Chapter 47) was amended in May 1986, requiring permits for all discharges to surface water whether the discharge was direct or indirect. An indirect discharge is any discharge to ground water, whether subsurface, land based or otherwise. The Indirect Discharge Rules, adopted in January

1990, provide procedures, standards and technical criteria for the implementation of the 1986 amendments. Permits are now required for any new indirect discharge greater than 6500 gallons per day and also for any existing large indirect discharge system. As of November 1994, there were approximately 225 permitted indirect discharge systems in the state.

An indirect discharge does not require the designation of a Waste Management Zone in the receiving water. However, the standard for issuance of such a permit is that the effluent cause no significant alteration in aquatic biota, a standard generally more stringent than that contained in the water quality standards for direct discharges.

11. Land Management - Septage and Other Beneficial Solid Wastes

Many of the guidelines associated with the treatment and utilization or disposal of sewage sludge, septage and other beneficial wastes became effective as rules in February 1989. Isolation distances, materials and site management, sludge monitoring and sampling are notable components of the rules and site certification process. Rule changes are being proposed concerning specifications for sludge composting, particularly operational and production standards.

12. Modifications to Surface Hydrology In Upland Areas

The hydrology of certain headwater areas in Vermont has become altered due to dense development in the upland watersheds. The effects of this are increased peak flows, increased soil erosion, streambank destabilization, in-stream siltation and turbidity, and altered habitat for aquatic biota. Several other headwater areas in Vermont are threatened by rapid, dense development that is either underway or being planned. Current state water quality standards and stormwater management policy do not adequately address this problem.

13. Wetlands Loss

The State Wetland Rules were adopted in February 1990, and apply to those wetlands which are determined to be "so significant that they merit protection." In addition to the Wetland Rules, Vermont wetlands receive protection from federal permitting programs, Act 250 and other state water quality programs.

In spite of the wetland rules and other protection programs, there is still a continuing loss of wetlands. Studies of wetland loss in Vermont have found that actual loss is from 200-400 acres per year. It is believed that many wetland alterations occur without Department knowledge. Also, certain of the wetland loss and impairment is to Class Three wetlands which are not protected by the wetland rules. Loss of wetland acreage may be permitted in Class One and Class Two wetlands when it is shown to

result in no undue adverse impacts to the wetland functions and values, as the result of a Conditional Use determination (CUD) issued by the Department.

14. Toxics/Hazardous Wastes

State legislative amendments enacted in 1990 require hazardous waste generators within Vermont to plan towards reducing the amount of hazardous waste generated and to reduce the use of toxic materials in manufacturing and/or operating processes. Large users of toxic substances must adopt initial plans by July 1995, to be updated every three years, as well as prepare annual performance reports. As of January 1995, 46 out of 55 Class A users have adopted initial plans. Of Class B users, 123 of 163 have adopted plans. The 1990 amendments also require solid waste districts to remove unregulated hazardous waste from the waste stream.

15. Landfills³

Most Vermont towns operated their own landfills or "dumps" until it was discovered in the 1970s that rainfall percolating through the landfill carried metals and volatile organic compounds into the groundwater. In addition, improperly constructed and maintained landfills result in soil erosion, causing sedimentation of nearby waterbodies.

Amendments to state solid waste legislation during the 1990 session of the General Assembly required all sanitary landfills in the state which receive annually over 1000 tons of refuse to be lined by July 1992, or face closure. The fifty unlined and two lined landfills in Vermont were to be closed in July 1992. Only one landfill was granted an operating extension. As of January 1995, all but five of the unlined landfills had been closed.

16. Junkyards³

The approximately 95 certified junkyards in Vermont (certified by the Agency of Transportation) have not been monitored for groundwater contamination as have landfills. However, it is estimated that junkyards are contaminating groundwater from petroleum products, radiator fluids, battery acids and heavy metals. Monitoring is needed to determine the extent and degree of contamination caused by junkyards.

17. Aquatic Toxicity³

Toxic organic compounds are being discharged into Vermont's lakes and streams, but do not cause long-term damage because many of the compounds break down or

³The information for this section was taken from Environment 1991: Risks to Vermont and Vermonters.

volatilize rapidly. Other toxics, such as PCBs and dioxins persist for long periods in sediments and fish, but there is no evidence that these organics are altering ecosystem health in Vermont. Impacts from these toxics are generally localized and of low severity; however, there is little evidence available to substantiate this assumption.

Metals, including lead and copper, which enter small urban watersheds from storm runoff, cause localized reduction in biodiversity. Ammonia and chlorine, principally from wastewater treatment facilities and accidental releases from swimming pools, have caused large fish kills in localized areas; however, the impacts are relatively short-term.

Of greater concern is the major risk to the future ecological health of the aquatic environment due to possible failure of aging wastewater treatment facilities. Most municipalities have not appropriated funds for repair or replacement contingencies of the wastewater treatment infrastructure.

18. Road Salt Application and Storage

Vermont's "Safe Roads Policy" for winter maintenance results in the use of approximately 110,000 tons of road salt per year by state road crews. Also, a significant amount of road salt is applied each winter season by town road crews.

There may be a decrease in salt contamination due to Vermont's policy on salt storage and application requiring stock piles to be located on impervious soil and covered. Also, the state has reduced its use of salt on certain roads. This policy, however, does not apply to municipal winter road maintenance programs. State programs and policies need to be extended to local programs.

19. Snow Disposal

The public's perception of direct disposal of waste snow into surface water from snow removal operations is negative due to the unsightly appearance of dumped snow and the presumed harmful effect on surface water. The Department, in cooperation with the Vermont Local Roads Program and the Vermont Agency of Transportation, developed and distributed in January 1991, a list of items municipalities need to consider when developing plans for snow disposal and a summary of the best management practices associated with a properly functioning snow disposal site.

Technical and planning assistance is being offered to municipalities practicing direct disposal of waste snow. The Winooski Conservation District, with Section 319 funding, is surveying Vermont municipalities and other northern states about snow disposal practices, and is establishing snow disposal demonstration sites.

20. Underground Storage Tanks

Since 1986, Vermont has implemented a program through the Underground Storage Tank (UST) Regulations to remove and remediate leaking underground gasoline and diesel fuel storage tanks. On average, 270 tanks per year have been removed since 1986, with close to 80% of the removed tanks showing some sort of contamination to soil or water. A cumulative total of approximately 400 active sites (sites now undergoing remediation and/or monitoring with department oversight) exists for the same period. Changes to the regulations included requiring permitted tanks to install leak detection equipment and to have corrosion protection and spill/overflow protection by July 1998. Other regulation changes concern system testing and tank closure procedures, financial responsibilities and actions to be taken by tank owners when leaks are first detected.

21. Governmental Cooperation and Communication

A comprehensive NPS management program needs to be developed and implemented in conjunction with neighboring state and local governmental units. Threats and impairments to surface and ground water uses in one state or town can originate or be caused by activities in another. For Vermont, coordination of the State NPS Management Program and the SCWS will involve communication and planning between the States of Massachusetts, New Hampshire, New York and the Province of Quebec. State level coordination will involve the Agencies of Natural Resources, Human Services and Transportation, and the Departments of Agriculture and Housing and Community Affairs.

22. Information Systems Management and Continuing Water Resources Program Development

The ability to store, manage and display surface and groundwater quality information will be useful in the planning and implementation of nonpoint source management activities. The growing amount and diversity of natural resource information requires coordinated yet systematic approaches concerning the acquisition and input, editing and eventual use of computerized information.

A systematic, comprehensive approach is needed to organize information on threatened and impaired ground water in order to be used in implementing protection and control measures. Current assessment and implementation approaches typically follow individual division or department practices and are not easily accessed for statewide ground water assessment or program planning.

F. RIVER BASIN WATER QUALITY MANAGEMENT PLANS

Fifteen river basin water quality management plans covering the entire state were prepared in the mid-1970s pursuant to Section 303(e) of P.L. 92-500, the federal Clean

Water Act. Certain of the river basin plans have been updated. The Ottauquechee River Basin Plan was the first to be updated with a plan for the Upper Ottauquechee Basin (towns of Sherburne and Bridgewater). Subsequently, the Upper West River basin plan was updated. The North Branch of the Deerfield River and the Mad River basin plans were completed but were not duly adopted. The Vermont State Clean Water Strategy, updated in 1993, is a state-wide river basin management plan.

The need for basin plan updates and revisions arises out of increasing conflicts between the demand for water based recreation and the increasing demand for the use of streams for the disposal of treated domestic sewage effluent, hydro electric generation, water withdrawal and other uses. Through the river basin planning process, the Department creates a forum for an open and broad public debate on the basic question of how waters should be used, managed and protected in the long term public interest. Attention is given first to those basins where impaired and threatened waters have been identified and to basins where natural values and low development create an opportunity for the public to consider preserving the waters in a relatively undisturbed condition.

The river basin planning process assures that those who may be affected by the planning process will have ample opportunity to participate. The planning process blends public policy and technical analysis in an iterative sequence where (1) public sentiment is obtained through interviews, meetings and hearings, (2) the intended and unintended consequences of public wishes are brought out by technical analysis and (3) where conflicts exist, the public is asked for an overall policy preference. This process will continue to a point of where either conflicts are resolved or where the conflicts are at least brought into sharp focus for possible resolution by the Water Resources Board or through the Wasteload Allocation Process.

The guiding principles and objectives of the river basin planning process are:

1. To guide river basin water use in a fashion which reflects the full diversity of public interest.
2. To give the public full access to the process of formulating a basin plan and designating water management goals.
3. To produce a plan which the Water Resources Board can adopt or endorse as a standard by which to judge future requests for reclassification.
4. To create an opportunity to respond to public interests in the planning of other water related resources that include but are not limited to: water access, valuable wetlands, fisheries management or special local water resources features and uses.

The ultimate purpose of these objectives is to provide guidance to State agencies and private interests so that through the permit process, the water resources of the particular river basin can be managed in the long term to attain the overall desired public uses of waters. Also, the intent of the objectives and the river basin planning process is to provide integrated basin-wide and environmentally sound management rather than a short term, piecemeal approach that only deals with limited concerns at any one time.

This river basin planning process is an attempt to deal with the consequences of growth on water quality and water uses. Once a plan is formulated and adopted there will be implications for future development. Local economies will also be affected to the extent that they depend upon the quality of the environment and on the recreational uses of the waters. With adequate research and a full opportunity for public input the plans should stand as a public statement of public intent for the use of the waters.

Public participation in the river basin planning effort is extensive. It occurs in the early stages with a notification to local and regional officials and others in the basin that the planning effort is to begin. The next stage of public participation is through personal interviews with public officials and other people in the basin who may have information about water uses and conflicts. After information is collected, one or more public meetings are held to present the information to the public and to obtain comments, corrections and additional information on water uses and use conflicts. When the river basin plan is finalized, one or more public hearings are held on the plan and a public responsiveness summary is developed. This extensive public participation assures a process and product which is useful to state, regional and local officials as well as reflects the concerns of the public at large.

G. DESIGNATION OF EFFLUENT LIMITED AND WATER QUALITY LIMITED WATERS

The Department no longer designates waters of the state as effluent limited or water quality limited. These designations were once useful to determine the degree of waste treatment required to meet the water quality standards for the receiving water. Eliminating a polluting discharge to a water quality limited segment was worth 3-6 points on the "Municipal Pollution Control Priority System" (Appendix F). The Priority System is being revised (Jan. 1995) and all references to water quality limited segments will be removed.

Presently, the Department utilizes the newly developed "Anti-Degradation Implementation Procedure" (Appendix C) and the recently adopted "NPDES Direct Discharge Permit Application Procedure" (Appendix D) to determine proper treated effluent discharge locations. The Department also utilizes the 303(d) List (Appendix E), as well as basin plans, water quality assessments, the "State Clean Water Strategy" and other studies, policies and procedures to make discharge location decisions.

H. SURFACE WATER MONITORING PROGRAM

Surface water quality monitoring undertaken by the Department supports an assortment of water program activities which represent a balance between short-term intensive and long-term trend monitoring. Monitoring activities are critiqued annually during program assessments to determine effectiveness in generating desired results. Modifications and/or terminations of monitoring activities are done following annual program assessments.

1. Toxicity Testing/Health Testing Program

The Department has an aggressive program of monitoring for sources and effects of toxic contaminants in surface waters. Certain activities, among others, related to the management of toxic discharges, have been carried out under this program:

- Performed, in cooperation with the Lake Champlain Basin Program (LCBP), two rounds of effluent testing for "priority pollutants" and acute/chronic whole effluent toxicity (WET) testing at ten major POTWs in the Lake Champlain Basin.
- Carried out, in cooperation with LCBP, a program of Lake Champlain tributary sampling using caged mussels as indicators of potential discharge of bioaccumulative toxicants from major tributaries to Lake Champlain; conducted follow-up ambient mussel contaminant surveys at the mouths of selected tributaries.
- Initiated, in cooperation with the LCBP and the New York Department of Environmental Conservation (NYDEC), an evaluation of the potential transport of toxic substances from small urban watersheds through the analysis of contaminant levels in sediments, fish and mussel tissue, and algae, macroinvertebrate and fish community metrics, and stormwater discharge inventories; project is in progress.

Ambient biosurveys of macroinvertebrate and/or fish communities are conducted annually at sites below point and nonpoint discharges in order to evaluate impacts from known discharges. Data can be interpreted to evaluate effects related to toxic substances. These data are used for a variety of evaluations, including permitting decisions related to the "reasonable potential" for discharges to impair receiving waters.

2. Special Monitoring Programs

In addition to the programs listed above, the Department has been involved in a number of special monitoring programs including, but not limited to the following:

- Continued biological sampling of Tenney Brook in Rutland in order to track the colonization of a "new" relocated stream bed by aquatic biological communities.
- Continued biological sampling of Lake Morey in Fairlee in order to document long-term impacts of alum addition on benthic invertebrates.
- Continued evaluation of the impacts of the lampricide TFM on non-target aquatic organisms in Lewis Creek in Charlotte/Hinesburg/Starksboro.
- In cooperation with USEPA, the Department has conducted macroinvertebrate sampling at selected sites in relation to the possible development of a regional data set to be used by Region I States to develop biocriteria.

3. Volunteer-Collected River and Stream Data

Citizens groups throughout the state are monitoring over 20 rivers and streams, collecting both chemical and biological data. Lay monitoring programs performing these studies are given technical support from the River Watch Network, local high schools, Vermont Natural Resource Conservation Districts, and the Department of Environmental Conservation.

4. Biological Sampling Program

The Ambient Biomonitoring Network (ABN) program is the most intensive and extensive monitoring program implemented by the Department. The ABN was established in 1985 to: 1) monitor long-term trends in water quality as revealed in changes over time to ambient aquatic biological communities, 2) to evaluate site-specific impacts of point and non-point discharges to aquatic biological communities, and 3) to establish baseline data to assist the Department in establishing Vermont-specific biological criteria for water quality classification attainment determinations.

Since 1985, the Department has utilized standardized methodologies for sampling fish and macroinvertebrate communities, evaluating physical habitat, processing samples, and analyzing and evaluating data. The program has led to the development of a Vermont-specific fish community Index of Biotic Integrity (IBI) and guidelines for determining water quality classification attainment using macroinvertebrate community biological integrity metrics and the Vermont IBI. Department protocols have been drawn upon by USEPA in the development of and are roughly comparable to those described in the USEPA Rapid Bioassessment Guidance Document, but are generally more rigorous.

Since 1985, the Department has conducted a total of more than 680 sampling events at approximately 350 individual sites. Five sites have 8 or more years of biological monitoring data; 36 sites have four or more years of data; 123 sites have 2 or more years

of data. Approximately 36% of all sampling events have included both fish and macroinvertebrate communities; approximately 63% of the sampling events have involved macroinvertebrate communities only and 1% fish communities only.

Physical, chemical, and biological data from the ABN program are managed on an in-house, GIS-compatible data base management system using Paradox data management software with interfaces to various statistical and graphical software packages. A variety of data export functions are available.

5. Intensive Survey Program

As previously mentioned (page 3), the statewide process for evaluating and re-sizing the lengths of Waste Management Zones below permitted direct discharge points has begun. This work directly utilizes the data obtained from the instream velocity measurement study which was conducted during the previous two years. Currently, ten such WMZs have been evaluated and re-sized utilizing the VTDEC "Class C Zone Length Determination Model". The NPDES permit renewal schedule is being used to prioritize this work; therefore, within the next five years, all of the WMZs within the entire state will have been evaluated and re-sized if necessary.

6. Spring Phosphorus Program⁴

The Spring Phosphorus Program collects total phosphorus data from up to 70 lakes each spring shortly after ice-out. Springtime phosphorus concentrations are related to summertime lake productivity, and this program provides the majority of the data used to determine the trophic status of Vermont's lakes. Potential problem lakes with elevated or increasing nutrient levels are also identified. Sampling once a year in the spring is an efficient way to monitor the water quality of a large number of lakes. Since the start of the program in 1977, the Department has collected spring phosphorus data on 219 lakes. A total of 156 lakes has been sampled four or more years. A core of 36 lakes has ten or more years of data.

7. Lay Monitoring Program⁴

The Lay Monitoring Program equips and trains local residents to collect lake water quality data weekly during the summer. Secchi disk transparency and chlorophyll-a data is obtained from most lakes and most stations on Lake Champlain that participate in the program. Total phosphorus data is additionally collected at most Lake Champlain stations and on some smaller lakes. Approximately 120 volunteers monitor the lakes each year. Yearly reports prepared for the monitors by the Department allow them to learn about the water quality of their lakes and to make comparisons between lakes.

⁴Lake monitoring and surveillance programs

Long term participation in the Lay Monitoring Program is encouraged. Since the initiation of this program in 1979, more than 70 lakes and 36 stations on Lake Champlain have been sampled at least one summer. Fifty-three lakes and twenty-five Lake Champlain stations have five or more years of full season data.

8. Lake Champlain Long-term Water Quality and Biological Monitoring Program

The Lake Champlain Long-term Water Quality and Biological Monitoring Program was designed to continue and expand upon the data collection activities started under the Lake Champlain Diagnostic-Feasibility Study (See under "Special Studies" below). The project was designed as an initial 2-4 year intensive characterization of water quality, phytoplankton, zooplankton and zoobenthos at 12 stations on Lake Champlain and at 18 tributaries in the Lake Champlain Basin. Samples have been collected during 1992, 1993 and 1994 so that water chemistry parameters can be paired with biological samples, allowing for data usage in large-scale trophic interaction models. The project is being conducted jointly by the State of New York, Department of Environmental Conservation and the State University of New York, Biological Survey. The project is currently being redesigned to focus in the future on the detection of long-term environmental change in Lake Champlain. Funding for the project is provided by the Lake Champlain Basin Program, using EPA funds appropriated under the Lake Champlain Special Designation Act of 1990. Data is maintained in a computerized database. Progress reports are submitted to the Lake Champlain Basin Program annually.

9. Aquatic Plant Survey Program⁴

Under the Aquatic Plant Survey Program, detailed qualitative aquatic macrophyte surveys are conducted on selected lakes and areas of Lake Champlain from mid-June to early September each year. All of the species present are identified and mapped with an indication of density and extent of cover. Detailed aquatic plant surveys have been completed on 93 lakes and in 27 major areas of Lake Champlain since 1982. Less detailed surveys have been completed on 139 additional lakes.

The Aquatic Plant Survey Program has given special emphasis to Eurasian watermilfoil in recent years. Lakes with known milfoil infestations (37 lakes as of November 1994) have been surveyed periodically to document the spread of this nuisance species, and uninfested lakes in the vicinity of known infestations have been searched for milfoil plants. In addition, a statewide Milfoil Watchers Program has been established under the auspices of Vermont's Eurasian Milfoil Control Program where volunteers are trained in milfoil identification and search techniques and they pledge to watch for milfoil on presently uninfested lakes.

10. Acid Precipitation Program⁴

Under the Acid Precipitation Program, chemical and biological data is collected on lakes located in low alkalinity (acid-sensitive) regions of the state to monitor the effects of acid deposition on Vermont's lakes. Nearly 200 lakes statewide were surveyed during the winters of 1980-1982 to identify the acid-sensitive areas of the state. Twenty-four lakes in these areas are now included in the *Long-term Lake Monitoring Program* and are being sampled four times every year for several chemical parameters. Biological sampling including fisheries and macroinvertebrate populations is also being conducted on some of these lakes. The information collected through the Acid Precipitation Program is being used to document the harmful effects of acid precipitation on Vermont's acid sensitive lakes. There are 110 lakes in Vermont considered to be threatened by acid precipitation. Of these, seven are already impacted by high acidity. Until the out-of-state sources of acid precipitation have been corrected, it is not anticipated that any attempt will be made to mitigate its impact on these lakes.

I. VERMONT LAKES AND PONDS PROGRAM

The primary objective of Vermont's Lakes and Ponds Program is to assure that the maximum sensible recreational potential of every Vermont lake is achieved and maintained. The program has four major elements: (1) monitoring and surveillance, (2) special studies, (3) management and restoration, and (4) protection. Each of these elements will be discussed in more detail in the following sections.

1. Monitoring and Surveillance

There are five basic monitoring programs that provide information on lake nutrient enrichment, algal and macrophyte productivity, water clarity, Eurasian watermilfoil populations, and the effects of acid precipitation on acid sensitive lakes. These five monitoring and surveillance programs (described above) are on-going programs that will be continued until there is no further need for the information being collected or until a change in priorities dictates a change in program emphasis.

2. Special Studies

Special studies are conducted as part of Vermont's Lakes and Ponds Program for a wide variety of reasons, but they can be generally categorized into three classes - diagnostic studies, lake modelling studies, and planning and management studies.

Diagnostic studies are initiated on selected lakes to diagnose a cause when water quality problems have been experienced or when a change in water quality has been detected. Diagnostic studies have been completed on seven lakes in Vermont. In every case, causes of water quality problems have been determined and recommendations for management or restorative action have been produced.

Where point source nutrient discharges presently exist or may be anticipated in the future, special *lake modelling studies* are undertaken to assess the water quality impact of the discharge(s). They are also undertaken to assure that Vermont Water Quality Standards are not and will not be violated by the discharges and that undue adverse impacts will not occur.

Special *demonstration projects* are being conducted within the state to assess the effectiveness of various milfoil management techniques. Several types of bottom barriers have been studied in Vermont, including Dartek, Texel, Palco and Bottom Line. Several Eurasian Milfoil Control Program reports have detailed the results of these studies. A very large scale mechanical harvesting project was initiated on Lake Bomoseen after more limited mechanical harvesting had been shown to be unsuccessful. However, it appears that regardless of the level of effort, lake residents are not satisfied with weed harvesting or hydroraking as control methods in heavily milfoil-infested lakes.

Lake water level drawdown has been attempted on three Vermont lakes. In the case of the largest lake, Lake Bomoseen, an extensive study was conducted before and after the fall 1988 and winter 1989 drawdown to determine the impact of the drawdown on aquatic plants, including milfoil and native plants, in the lake proper and in the large wetland bordering the lake. Impacts on wildlife, fisheries and macroinvertebrates were also studied. It was concluded that the negative impacts on native plants, fish, invertebrates and wildlife outweighed the short-term positive impact of Eurasian watermilfoil control in the exposed 0-4 foot depth zone of the lake.

The most promising prospect for long-term control of Eurasian watermilfoil in Vermont may be a natural biological control agent. In late 1989, it was discovered that a previously thriving Eurasian watermilfoil population in Brownington Pond had nearly disappeared. Native plants had begun to repopulate the lake. Upon closer examination, a variety of herbivorous insects was found in the sole remaining milfoil bed, including two aquatic caterpillars and a weevil. The Department has applied for and received funding under the Clean Lakes Demonstration Program to determine if the insects played a role in the Brownington Pond milfoil, and, if so, to investigate whether they could be used in other milfoil-infested lakes to bring about a reduction in milfoil growth. Of the three insects, the weevil has shown the most promise. In 1993, the Department and a contractor, Middlebury College, began rearing weevils in the laboratory and introducing them to lakes. Weevils have caused considerable damage to milfoil plants at the introductory sites, but it remains to be seen whether they can cause large beds to collapse. Introductions and monitoring will continue for the next several years.

Special *planning and management studies* are initiated when additional data is required to make informed management decisions. In response to concerns regarding possibly dangerous levels of toxic substances in Lake Champlain fish, a special *Fish Contaminant Monitoring Program* was initiated in 1986 to assess the existence and/or extent of toxic contamination in fish tissue in the lake. This program was formalized in

1988 with an Interagency Fish Contaminant Monitoring Committee composed of representatives from the Vermont Departments of Fish and Wildlife, Health, and Environmental Conservation.

The *Lake Champlain Diagnostic-Feasibility Study*, designed to gather data on phosphorus sources to the lake and in-lake responses over a two-year period was completed in 1994. The information collected during the study was used by the Lake Champlain Management Conference to develop broad-based phosphorus management policies for Lake Champlain, as well as basin-specific phosphorus reduction strategies to assure that the water quality of each portion of the lake meets segment-specific water quality standards for total phosphorus. The Lake Champlain Diagnostic Feasibility Study was conducted in conjunction with the New York State Department of Environmental Conservation, with substantial funding assistance from the U.S. Environmental Protection Agency under Sections 205(j)(1) and 314 of the Clean Water Act and cooperative assistance from the U.S. Geological Survey.

3. Management and Restoration

There are two possible courses of action once the cause of a lake's water quality problem has been identified through monitoring and surveillance or special studies. Either a feasibility study is initiated to gather information and determine what management or restoration measures would be appropriate, or management or restoration activities may immediately be recommended if a study is not warranted. In Vermont, a distinction is made between aquatic nuisance management activities and lake restoration activities. Management activities are those control measures that manage a nuisance but do nothing to eliminate the source of the nuisance. Restoration activities are aimed at eliminating the source of a problem in order to achieve long-term benefits.

Aquatic nuisance management activities in Vermont are exclusively used to control excessive rooted macrophyte growth. When several alternative plant control methods are possible in a lake, a feasibility evaluation is made by state personnel to determine the best alternative. Financial assistance is then available to municipalities through the Aquatic Nuisance Control Program for the implementation of recommended lake management activities. To date, fourteen municipalities have received assistance under this program. In addition, the U.S. Army Corps of Engineers and the State of Vermont cooperate in funding the Lake Champlain Aquatic Nuisance Control Program to manage water chestnut and Eurasian watermilfoil growth in southern portions of Lake Champlain. Management techniques such as copper sulfate treatments for the control of excessive algae growth are rarely used.

Lake restoration activities have been undertaken on several Vermont lakes and recommendations for lake restoration have been developed for several others. Funding for lake restoration activities may include federal, state, or local sources, or a combination of these.

The U.S. Soil Conservation Service and local farmers have been instrumental in lake restoration activities in Vermont through the implementation of agricultural best management practices in lake watersheds. Lake Parker, Lake Carmi, Lake Iroquois, Lake Memphremagog and Lake Champlain have all benefitted from Soil Conservation Service programs in recent years. In addition, the staff of the George D. Aiken Resource Conservation and Development Area assisted the Town of Barnard and the Silver Lake Association in developing an erosion control plan for the Silver Lake watershed in Barnard.

4. Protection

Vermont is fortunate to have only a limited number of lakes which do not presently meet water quality standards and are in need of extensive lake management or lake restoration work. The 1994 lake assessment data indicates that the water quality of 31 percent of Vermont's inland lakes that fully support their uses is threatened. If the present high water quality of these lakes is to be maintained, effective broad-based lake protection measures must be implemented soon to generally reduce common threats, and lake-specific protection measures must be developed for priority lake watersheds. Continued monitoring and the recently-completed Lake Protection Classification System are being used to identify lakes in particular need of protection.

The Vermont Lake and Watershed Protection Program was implemented in 1989 in response to the urgent need for specific education and technical assistance pertaining to shoreland and watershed lake protection measures at the state, regional, local and individual level. Currently, the major focus of the Lake Protection Program is the encouragement of action at the local level for the protection of lake water quality, since Vermont's statewide regulations cover only a fraction of development activity. This encouragement is being achieved through development of planning manuals for municipal and regional planners, through general information sent to local planners that provides an overview of lake and watershed issues relevant to water quality, and through individual contacts and assistance where possible. In addition, a 1993 Lake and Watershed Survey enables residents to learn about a lake's watershed and to plan protection activities. It is hoped that the Lake and Watershed Protection Program will cause lake protection to become an important part of the local planning process.

J. RIVERS ASSISTANCE PROGRAM

Since the passage in the Vermont legislature of the Pristine Streams Act (1986) and the Rivers Bill (1987), Vermont citizens have become more active in river protection and restoration. These laws place an emphasis on river uses and values and their consideration during environmental permit processes. In 1989, the Rivers Assistance Program was initiated to help citizens, interested organizations, municipalities, regional planning commissions and other state agencies in the full range of activities related to identification, protection, and restoration of river uses and values.

The Rivers Assistance Program is working with two dozen watershed associations (as of 1994), with citizen activity occurring in every major river basin in Vermont. By and large, these citizens are interested in a broad-based approach to river management and have become invaluable to state-wide basin planning efforts. The River Assistance Program is providing technical assistance and educational materials and exchanging information with the public on an on-going basis.

The Rivers Assistance Program responds to public requests for help in interpreting state statutes and regulations. The Program provides a means for the public to get involved in permit and enforcement processes and minimize river use conflicts which arise from misunderstandings of the state authority to protect river values.

The Rivers Assistance Program initiates projects with regional planning commissions, municipalities and citizen interest groups that will address river protection priorities and provide technical assistance in river planning, Outstanding Resource Water (ORW) designations and river reclassifications. Technical assistance includes documentation of existing and designated river uses and values as part of a basin planning process and provides the basis for citizen petitions to reclassify or designate rivers. Citizen documentation of river uses and values is also used by the Division to make findings under the anti-degradation implementation procedures that are applicable to any discharge or activity subject to Vermont Water Quality Standards.

The Rivers Assistance Program maintains a statewide rivers inventory and evaluation that maps and describes river values and provides agencies, municipalities, interested citizens and policy makers with information on:

- a. the regional or statewide significance of unique, rare and publicly valuable Vermont river qualities;
- b. existing river uses and the public interest in river conservation and protection; and
- c. the status of impairments or threats to river uses and values.

The Rivers Assistance Program provides the public with techniques for assessing pollution sources and causes that may threaten or impair river uses. Technical assistance is provided to develop and carry out remediation plans, including proposal and grant writing, coordination with local, state, and federal programs, and the implementation of nonpoint source best management practices.

The Rivers Assistance Program works with towns and landowners to undertake river shoreland conservation. Educational materials are developed to help the public understand river ecosystems, watershed functions and the value of conserving river shorelands.

K. WETLANDS PROGRAM

Vermont wetlands are significant resources that contribute to the economic, cultural, and physical well being of its residents. Wetlands provide numerous ecological functions and social values, including habitat for fish and wildlife, recreational and educational opportunities, habitat for threatened and endangered species, temporary storage of flood waters, and aid in the maintenance of water supply and quality. However, these resources have been significantly affected by human land and water use activities.

The Vermont Wetlands Office and the Soil Conservation Service are the primary sources of tracking information on state wetland loss. Based on these sources, annual wetland loss in Vermont is at least 200 acres, and may be as high as 400 acres. Projects reviewed by the Army Corps of Engineers and the Environmental Protection Agency are also reviewed and tracked by the Vermont Wetlands Office. This loss estimate does not take into account offsetting wetland gain associated with agricultural land abandonment and natural reversion to wetland, nor does the estimate take into account gains associated with programs to restore wetlands on drained agricultural lands, as these programs are relatively new in the state and have resulted in small areas of restoration to date. Offsetting wetland gain associated with beaver activity is assumed to be relatively small as this activity has been found to mostly alter the hydrology of existing wetlands, not create wetlands from existing uplands.

In February 1990, the Water Resources Board adopted rules to accompany the Vermont Wetlands Act [10 V.S.A. Chapter 37, Section 905(a)(7-9)]. The Vermont Wetland Rules apply to those wetlands which are determined to be "so significant that they merit protection." The determination of whether any specific wetland merits protection under the Rules is based on an evaluation of the extent to which it serves one or more of the functions listed in the Act. Wetlands identified on National Wetlands Inventory (NWI) maps and contiguous wetland areas have been initially designated by the Board as significant wetlands.

Under the Rules, the Board adopted the Federal Method for Identifying and Delineating Jurisdictional Wetlands. The Rules contain a list of allowed uses in significant wetlands that would not require any review by the Department provided it does not involve any dredging, filling, grading, or alterations of the water flow. Examples of allowed uses include silvicultural and agricultural activities that are in compliance with conditions listed in the rules, routine repair and maintenance of existing structures, recreational activities, and fish and wildlife management. Any other uses in significant wetlands other than allowed uses would require a Conditional Use Determination (CUD) by the Secretary of the Agency of Natural Resources. A determination may only be granted when it can be shown that the proposed activity will not have an undue adverse impact on the significant functions of the wetland. The Secretary may determine

in some cases that undue adverse impacts may be sufficiently mitigated. A petition process is provided to upgrade or downgrade the classification of any wetland.

The U.S. Army Corps of Engineers has federal jurisdiction over wetlands through Section 404 of the Clean Water Act and through Section 10 of the River and Harbors Act. Section 10 regulates the dredging and filling of navigable waters. Section 404 has jurisdiction over a greater number of wetlands than does Section 10, but it only regulates the discharge of dredge and fill materials into wetlands. Many activities do not require a permit under Section 404. Normal farming and silvicultural practices, including forest road construction as well as temporary roads, are exempted activities. Many small wetlands (areas where surface waterbodies and associated wetlands are smaller than 10 acres), isolated wetlands and those associated with small streams (with an annual flow less than 5 cubic feet per second) have only recently and then only partially fallen under the jurisdiction of Section 404. The Department works closely with the Corps' Vermont Field Office staff on many projects.

The U.S. Environmental Protection Agency and Fish and Wildlife Service also participate in the implementation of Section 404 of the Clean Water Act. These agencies review permits and provide comments and recommendations on whether permits should be issued by the Corps. EPA has the authority to veto any application or overrule any disposal site designated in a permit reviewed by the Corps if it finds project impacts to be unacceptable.

The Department has adopted a formal agreement with the Corps of Engineers which established a 401 water quality certification program pursuant to Section 401 of the Act (401 Certification). The wetlands staff prepares or provides comments on any 401 Certifications that involve wetlands. Under the agreement with the Corps, a 401 Certification must be issued by the state prior to the issuance of a Corps individual or nationwide permit.

Vermont's Land Use and Development Control Law (Act 250) requires a permit for most⁵ major land development and subdivision in Vermont. The law provides for broad review of the environmental impact of those developments and subdivisions subject to its jurisdiction under ten criteria. The ten criteria include: water pollution, waste disposal, flood plains, shorelines, soil erosion, aesthetics, natural areas, and wildlife habitat, among others. Where a project falls within the jurisdiction of Act 250, District Commissions and the Environmental Board have the authority to protect important wetland values that pertain to the ten criteria of the Act. In addition to other applicable criteria, an applicant must show they are in compliance with the Vermont Wetland Rules under Criterion 1(G) of the Act.

⁵ Many projects fall outside the jurisdiction of Act 250. Most agricultural and forestry-related activities are not regulated under the Act. Furthermore, small scale industrial, commercial and residential projects are not addressed through the Act 250 process.

The Management of Lakes and Ponds statute (29 V.S.A., Chapter 11) manages lakes and ponds and their shorelines and recognizes these resources as a public trust to be managed for the public good. The jurisdictional boundary for the purposes of this law is "public waters and lands underlying the water below the mean water level." Such factors as water quality, fish and wildlife habitat, aquatic and shoreline vegetation and recreational uses of the areas are criteria which are considered when permits for encroachments are reviewed. This law does afford some measure of protection for wetlands located beyond the mean water level of lakes. Isolated wetlands, or those wetlands located above the mean water level of lakes, are not covered under this law.

The Stream Alteration law (10 V.S.A., Chapter 41, Subchapter 2) mandates a permit for activities which would change, alter, or modify the course, current, or cross section of any watercourse having a drainage area greater than 10 square miles by movement, fill, or excavation of 10 cubic yards or more of material. This law can prohibit the alteration of streambanks with riverine wetlands if it is found that such activity would significantly damage fish or wildlife, the rights or riparian owners, or if it would adversely affect the public safety by creating flood hazards. This law is limited to wetlands within the area confined by the streambanks.

Wetland loss in Vermont is a priority issue. In light of the increased understanding of the many benefits that society derives from wetlands, the filling and draining activities which occur in wetlands must be regulated. In addition, significant wetlands must be acquired for the benefit of future generations.

L. GROUND WATER MANAGEMENT PROGRAM

Vermont's ground water statute, "Ground Water Protection Rule & Strategy" provides for the classification of ground water into four classes based on use, water quality and risk of contamination. The state's ground water policy declares, in part, that the state "...shall protect its ground water resources and maintain high quality drinking water, and shall manage its ground water resources to minimize the risks of ground water quality deterioration." The assumption of the policy is that the use of ground water for drinking is the preferred use and that other uses are more or less compatible with that use. Only Class 4 ground water is not suitable as a source of drinking water.

The statute asserts that risks to ground water quality are associated with human activities in the vicinity of the aquifer. Due to Vermont's highly variable geology and the lack of detailed hydrologic mapping, the concept of vulnerability as applied in other regions is not currently of much use in protecting the resource. Water tables are typically less than 10 feet below land surface, soils are thin except along valley floors and fractured crystalline bedrock provides little in the way of filtration. Given the present level of ground water mapping in Vermont, there is little data to distinguish between the vulnerable and less than vulnerable resource.

In recent years, the priority focus of Vermont's ground water-related programs has been interagency coordination to develop an Interagency Ground Water Management Plan (Appendix H) and the development of Geographical Information Systems (GIS) to better manage data and enhance coordination. GIS is seen as the most efficient way by which ground water resource data can be compared to potential and existing pollution source data to allow state and local managers to manage and protect the resource.

Vermont's ground water-related programs include: Hazardous Materials Management, Solid Waste Management, Agricultural Plant Industries, Public Water Supply, Well Drilling, Wastewater Management, Road Deicing Management, and Land Use Regulation. All of these program areas help to prevent ground water quality deterioration. Fortunately, Vermont's programs include almost all of the 6 strategic activities listed in the Federal Comprehensive State Ground Water Protection Program (CSGWPP) guidance; however, Vermont needs to overcome some major obstacles in order to implement a CSGWPP, including a lack of state resources, the apparent lack of a sense of urgency regarding ground water protection, and the current inability to compile, assess and report ground water-related data.

M. SECTION 319, 604(b) and SECTION 106 GRANT PROGRAMS

Sections 319 and 604(b) are sections of the federal Clean Water Act which authorize EPA to make grants to the states to carry out nonpoint source implementation and water quality management planning, respectively. Many of the activities described earlier in this document are eligible for funding and are funded with either Section 319 or 604(b) funds.

Vermont's 319 and 604(b) project agenda includes river basin water quality management, assimilative capacity studies, review and revision of the Continuing Planning Process, public participation efforts, and nonpoint source implementation. It also includes wetland protection, aquifer protection, water quality studies for proposed hydroelectric projects, comprehensive river planning and erosion control.

Amendments to Section 604(b) require the Department to "pass through" to regional planning organizations within the State a portion of the annual grant. Funds that are to be passed through to these organizations will be targeted to identify water quality problems and to develop plans or measures for problem mitigation.

Section 106 of the Clean Water Act authorizes grants to the State for pollution control programs. The State of Vermont pollution control program consists of a number of activities briefly described below and in more detail under the Vermont Discharge Permit Program.

1. Water Quality Assessment [305(b) Report]

This section of the 106 Program references the current 305(b) Report (State of Vermont 1994 Water Quality Assessment) for a status of and trends in Vermont water quality.

2. State Strategy

This section outlines the state's approach to water pollution control. The present strategy includes participation in the National Municipal Policy development (the National Municipal Policy is a map for future utilization of limited funds to abate the remaining pollution), implementation of the ground water strategy, and a review of existing onsite sewage disposal systems.

3. Work Program

The 106 work program consists of a number of efforts. The construction grants management staff oversees the planning, design, and construction of municipal facilities. The permit program issues discharge permits, pretreatment permits, or temporary pollution permits for all discharges including stormwater. Enforcement is carried out by the Enforcement Division with the aid of the laboratory compliance monitoring efforts.

Several activities in the water quality planning and standards area are coordinated among the various divisions and sections of the Department of Environmental Conservation . Wasteload allocations are translated into permit conditions. These activities, as well as review of permits and facilities plans, are coordinated between the Waste Water Management, Water Supply, Public Facilities and the Water Quality Divisions by the use of the *NPDES Direct Discharge Permit Application Procedure*. The Procedure advises the applicant to review discharge alternatives with the aforementioned divisions to insure the proposed discharge is consistent with the Vermont Ground Water Protection Rule and Strategy, the Water Quality Standards, the Indirect Discharge Rules, and the Anti-Degradation Policy.

Efforts of the Operations and Maintenance Section of the Department include: compliance inspections of those facilities where problems are expected; technical assistance to municipal treatment plant operators on a regular basis and during special times where there is significant noncompliance with permit conditions; development of composite correction plans to correct problems. Training is also part of the Operations and Maintenance Section's effort. Training consists of facility lab evaluations, review of operator techniques and review of plant operation to achieve more reliable operation, as well as on-site and classroom training.

The annual Section 319 and 604(b) work plans and listing of projects developed under the Municipal Water Pollution Control Project Priority System for Section 106 as

proposed by the Department of Environmental Conservation are subjects of public hearings. Comments received are considered and changes are made to the workplan/listing as may be necessary.

**N. STATE OF VERMONT WATER QUALITY ASSESSMENT
[305(b) REPORT]**

Section 305(b) of the Clean Water Act requires each state to submit a biennial report to the Environmental Protection Agency (EPA) describing the quality of its navigable waters. EPA, in turn, is required to transmit the state reports to Congress, along with a summary of these reports describing the quality of the nation's waters.

The 1994 report included the findings of four separate state efforts, which contain assessments of point and nonpoint source pollution for (1) rivers and streams, (2) lakes and ponds, (3) groundwater, and (4) toxics. Many professionals and individuals provided information on the state's surface waters.

The 305(b) Report assessed rivers and streams using both the EPA definition of uses and certain of those uses described in the State Water Quality Standards. Lakes and ponds were assessed on degree of support of the EPA - defined uses only. The assessment resulted in the following conclusions:

1) Vermont's water quality continues to remain generally excellent, with a high percentage of the state's waters fully supporting uses as called for in the water quality standards. The expenditure of \$416 million to construct wastewater treatment facilities and appurtenances, as well as many more millions spent for nonpoint source pollution programs since the federal Clean Water Act was passed in the 1960's, has enabled Vermont to become one of the states with the highest percentage of waters meeting water quality standards.

2) Of the 5,264 miles of rivers and streams assessed, 81% fully support designated water uses, 15% partially support uses and 4% do not support one or more uses. Some types of threats to designated use support are thought to exist for 22% of the fully supported river and stream miles.

3) Of the 52,809 acres of "inland"⁶ lakes and ponds assessed, 34,467 acres (65%) fully support the designated uses, 11,860 acres (23%) partially support uses and 6,482 acres (12%) do not support one or more uses. For Lake Champlain, 156,380 acres partially support (90%) water uses and 17,795 acres (10%) do not support one or more uses.

⁶"Inland" lakes are all Vermont lakes and ponds except Lake Champlain.

4) Some of the fishing use of Lake Champlain in Vermont is threatened to a noteworthy degree. The majority of this threat arises from PCB contamination in the tissue of lake trout over 25 inches in length and mercury contamination in walleye greater than 19 inches. These findings have resulted in fish consumption advisories. No health advisories are necessary for other Lake Champlain fish species or for lake trout or walleye taken from other Vermont lakes. Also, water supply, recreational, aesthetic, aquatic life uses and values of Lake Champlain are threatened by the discovery of the zebra mussel in 1993.

5) Threats to designated use support exist for 48% of inland lake and pond acreage currently supporting uses, principally from land development, Eurasian watermilfoil, threshold in-lake nutrient levels and acid precipitation. The spread of Eurasian watermilfoil poses one of the greatest threats to boating and swimming on Vermont lakes. Thirteen percent of lakes that are 20 acres or larger are infested with milfoil, including the state's three largest lakes - Lake Champlain, Lake Memphremagog and Lake Bomoseen. One hundred-twelve lakes have low alkalinities and are considered to be threatened by acid precipitation. Fifteen lakes are critically acidified.

6) Nonpoint pollution remains the most widespread source of water quality impairment affecting rivers and streams now that Vermont has completed construction of the two last POTWs. The principal nonpoint sources of impairments to rivers and streams are (listed in descending order of impairment) agricultural runoff, streambank destabilization and erosion, removal of riparian (streamside) vegetation, upstream impoundments, flow regulations/ modifications, land development, natural sources and highway maintenance/runoff.

7) The four most common nonpoint causes of water quality impairments are siltation (impairing 874 miles), thermal modifications (461 miles), organic enrichment/low D.O. (453 miles impaired) and nutrients (443 miles). Other common causes of nonpoint source (NPS) impairments to rivers and streams are pathogens (as indicated by Escherichia coli, or E. coli bacteria), other habitat alterations and flow alterations.

8) Nonpoint pollution is also the most widespread source of water quality impairment affecting lakes and ponds. The main source of impairments to inland lakes is runoff from various kinds of land uses. "Unspecified nonpoint sources" was listed most often because detailed source information is not available in most cases. Specifically, however, runoff from agricultural lands, roads and streambank erosion ranked highest among cited sources. Flow regulation is the source of impairments due to fluctuating water levels, and recreational activities (boating) is thought to be the primary source of the spread of Eurasian watermilfoil.

9) Flow alteration is the main cause of impairment which affects the most inland lake acres (12,253) due to the impairment of fish habitat in some of Vermont's large

reservoirs. Nutrient enrichment is the second greatest cause of impairments, affecting 7,665 acres of lakes and causing nuisance algae blooms (third greatest cause) in most cases. Organic enrichment (also related to nutrient enrichment) and siltation are the fourth and fifth highest cause of inland lake impairment, respectively. Although ranking seventh among current impairments, non-native species infestations (primarily Eurasian watermilfoil) affect 1,765 acres and are perhaps the fastest growing cause of impairment to lakes.

10) Nutrients are the major cause of use impairment of Lake Champlain, affecting all but one section (Malletts Bay) of the lake. Other related causes of use impairment are siltation, organic enrichment and algae blooms. Priority organics and metals are the second highest cause of use impairment (PCB and mercury contamination of lake trout and walleye populations, respectively, resulting in fish consumption advisories). Eurasian watermilfoil and waterchestnut, two non-native aquatic plants, infest a total of 2605 acres of Lake Champlain.

11) New initiatives which involve the public in volunteer monitoring, land use management and in reclassification petitions have heightened the public's awareness of water quality issues with resulting actions. As a result of increased public awareness and subsequent reporting of water quality problems, Vermont is likely to see an increase in impaired or threatened miles or acres reflecting this reporting for a time. However, as people organize to act, improvements may be seen on some rivers and lakes as a result of these actions.

The Water Quality Assessment is not included with this report but is available from the Department of Environmental Conservation.

O. STORMWATER MANAGEMENT

In accordance with the requirements of 10 V.S.A., 1264, a stormwater management plan was prepared and forwarded to the legislature and the Water Resources Board. Subsequently, "Draft Stormwater Procedures" were prepared. (Appendix I)

The Water Resources Board has incorporated key elements of the Stormwater Management Plan into the Water Quality Standards. In the Water Quality Standards, stormwater discharges are divided into major and minor discharges. Specific discharge requirements are set which are distinct from the water quality criteria. Emphasis is placed upon using best management practices for controlling stormwater including natural infiltration, preserving natural drainage ways, and utilizing effective erosion control measures.

Stormwater discharge permit applications are presently reviewed by the Vermont Department of Environmental Conservation on a case by case basis according to the

"Draft Stormwater Procedures." Each review, determined on the basis of whether the proposed land use change will result in a discharge to waters of the state, includes an evaluation that the discharge from the site will not create any "undue adverse effect" and that, when necessary, post development peak discharge will not exceed pre-development peak discharge.

Vermont has not yet implemented the federal stormwater program. However, the Department has received authority from EPA to issue general permits to implement the stormwater program and is in the process of developing general permits for the federal program.

P. HAZARDOUS MATERIALS MANAGEMENT PROGRAM

The Hazardous Materials Management Division performs emergency response for hazardous materials spills, issues permits for federal and state programs regulating hazardous wastes and underground storage tanks and manages cleanup at hazardous sites under state and federal authorities including the Resource Conservation and Recovery Act (RCRA) or Comprehensive Environmental Response Compensation and Liability (CERCLA, also known as Superfund). The Division is composed of three sections: Management & Prevention, Sites Management and Technical services.

1. Management & Prevention

This section performs permitting and compliance inspections for both underground storage tank facilities and hazardous waste facilities including locations where wastes are generated, stored, treated, or disposed. The section also performs hazardous waste planning activities, including development and adoption of state hazardous plans and participates in the federal Capacity Assurance Plan requirements.

2. Sites Management

This section performs site management activities at petroleum and chemical release locations ranging from evaluation and control (fencing, alternative water supplies or treatment) up to long term hydrogeologic and risk assessment studies at Superfund sites. Project management includes contract administration and cost control for funds expended from the Petroleum Cleanup Fund and Environmental Contingency Fund.

3. Technical Services

This section performs public information activities including newsletters and rule guidance. This section also performs sampling and engineering evaluation specialties for all sections of the division including water supplies, air, soils or solids. It administers the hazardous waste source reduction rules.

Q. SOLID WASTE MANAGEMENT PROGRAM

The passage of Act 78, Vermont's Solid Waste Management Law, led to the creation of the Solid Waste Management Division within the Department of Environmental Conservation. In addition to preparing the State's Solid Waste Management Plan, the Division's duties are summarized by Section as follows.

1. Planning

As mandated by Act 78, this Section works with municipalities, regional planning commissions and the solid waste districts in developing plans and coordinating inter-municipal and inter-regional solid waste planning activities.

2. Recycling and Resource Recovery

Activities range from the development of state-wide and region-wide markets for recycled materials to waste reduction strategies. Information, education and technical assistance is offered on establishing community programs from paper to harmful household hazardous products.

3. Certification and Compliance

Staff within this Section of the Solid Waste Management Division are responsible for administering a certification and permit compliance process for landfills, recycling centers, transfer stations, demolition debris disposal sites and stump dumps. A close relationship is established with this Section and the Air Pollution Control Division in reviewing and permitting trash-to-energy facilities.

4. Technical Assistance

Programs are offered to landfill owners and operators and to solid waste districts regarding the operation and maintenance of landfilling facilities. Staff also is responsible for managing the landfill environmental assessment program, reviewing water quality data associated with landfill surface runoff or leachate and evaluating populations for landfill certification.

5. Residuals Management

Staff in this section oversee the state's sludge and septage management program. Planning grants have been awarded to four regional solid waste districts, comprising 75 to 80 percent of the state's sludge, to devise management techniques, which range from composting to continued land application by purchasing land specifically for that purpose.

R. ENVIRONMENTAL ENFORCEMENT

The recent passage of state legislation has provided the Secretary of the Vermont Agency of Natural Resources greater authority for enforcing existing environmental laws. The legislation established hearing and enforcement procedures including administrative orders and penalties. Fines may be issued up to \$100,000 for each violation and may be accompanied by emergency orders such as stop-work orders, permit stays and appeals. In addition to creating approximately ten new field positions, the law established an environmental law division with an environmental law judge to adjudicate those cases brought before her.

S. HYDROELECTRIC PROJECT REVIEW

The Federal Power Act (FPA) of 1920 and its subsequent amendments require the Federal Energy Regulatory Commission (FERC) to license (or exempt from licensing) and regulate hydroelectric projects on navigable waterways and those projects not located on navigable waterways but constructed or requiring additional construction after 1935, and affecting interstate commerce interests.

The FPA preempts any state regulations that would otherwise apply to these projects. Other state regulations that are also preempted are the state Land Use and Development Control Law (Act 250), the fish passage statute (10 V.S.A., Chapter 3, Section 4607), and stream alteration permits (10 V.S.A., Chapter 41 and Chapter 43, and 30 V.S.A., Chapter 248).

In addition to FERC licensing requirements, Section 401 of the Federal Clean Water Act of 1972 and its subsequent amendments require an applicant for a federal license or permit to obtain a state certification that any discharge which may originate from the facility will not violate state Water Quality Standards. The state 401 Certificates are issued with specific conditions regulating activities during project construction and operation and may include minimum flow releases in order to maintain standards. Although the state of Vermont has the authority to regulate licensed hydroelectric projects under the 401 process, many Vermont projects are unlicensed. Minimum flows at these projects can be required, using the streamflow regulation statute 10 V.S.A. Chapter 41. If the state determines that the artificial regulation of stream flow threatens the public interest or welfare or an emergency exists, the state may call the owner(s) of the dam to conference and negotiate or require modification of stream flow.

The Department also issues desilting orders in accordance with 10 V.S.A., Section 1272. These orders prescribe the exact procedure to be followed by the dam owner in desilting an impoundment. The Department works with the owner in defining a reasonable procedure which will minimize the discharge to State waters.

In order to assist the review of hydroelectric projects and other projects which may adversely impact water quality standards, as well as to provide information for the "Inventory of River, Lake and Wetland Uses, Values and Functions," the Department commissioned several studies to be undertaken. These studies, most of which have been completed, provide detailed information on aquatic and riparian resources, as well as existing hydroelectric facilities. The studies include:

- "Hydropower In Vermont. An assessment of Environmental Problems and Opportunities." Two volumes. 1988
- "The Waterfalls, Cascades and Gorges of Vermont." 1987
- "A Guide for Evaluating the outstanding Rivers and Streams of Vermont." 1988.
Part 1: "The Identification and Protection of Outstanding Streams."
Part 2: "Exemplary Streams in the West River Basin."
- "Vermont's White Water Rivers. Their Geology, Biology and Recreational Use." Draft 1989.
- "Public River Resources Assessment. A Study of High-Priority Water-Related Features and Recreation Sites." Uncompleted.
- Four state Comprehensive River Plans (Winooski, Clyde, Deerfield and Passumpsic).

T. PUBLIC PARTICIPATION

Extensive efforts are expended in the Department to encourage and provide for public participation in the development and administration of state programs. In addition to the public involvement in the program mandated by federal procedures, the State of Vermont has an Administrative Procedures Act which requires that any "... agency statement of general applicability that implements, interprets or prescribes law or policy or describes organization procedures, practice requirements" be adopted by a public process involving public notice and opportunity for public comment.

Notices of grant applications are distributed to groups statewide and notices of public hearings are published in newspapers throughout the state. The grants undergo intergovernmental review through the state clearinghouse process.

In order to enhance the ability of the public to freely input into the process, it is the Department's normal procedure on complicated or significant issues to conduct an

information meeting prior to the formal hearing where a free exchange of dialogue without the encumbrance of formal process can occur.

On major issues, such as adoption of a state groundwater strategy, or the State Clean Water Strategy, multiple public meetings are conducted as well as efforts designed to educate the public in the basic science involved, the issues at stake and the alternatives available.

The Department no longer centralizes the public participation implementation effort. Implementation is the responsibility of the program manager under policy direction and overview by the Commissioner. Each program manager is in a position to identify and insure participation in the decisions uniquely significant to his/her program and the involved public.

U. PROCESS FOR IDENTIFYING WATERS NEEDING WATER QUALITY-BASED CONTROLS AND DEVELOPING TMDLS (TOTAL MAXIMUM DAILY LOADS)

Section 303(d) of the Clean Water Act requires States to identify waters that do not or are not expected to meet applicable water quality standards with technology-based controls alone. Waters impacted by thermal discharges are also to be identified. States are required to establish a priority ranking for these waters, taking into account the pollution severity and designated uses of the waters.

Once the identification and priority ranking of the waters are completed, states are to develop TMDLs at a level necessary to achieve applicable state water quality standards. Total loads include pollutants from point and nonpoint sources. The public must be involved with the development of the priority ranking and targeting of waters needing TMDL determinations. The public must also be consulted to assist the determination of load allocations to particular sources. States must determine pollution controls to be implemented, a schedule for data collection, establishment of the control measures, assessment for water quality standards attainment and, if needed, additional modeling.

Dating back to the statewide water quality assessments conducted in 1987, the Department has utilized a comparative evaluation procedure for each impaired waterbody. The following five considerations were used to generate the High Priority Targeted Impaired list of waters:

- the severity of the water quality problem or impairment;
- the degree to which a designated use or uses were impaired;
- the amount of public interest or support in solving the problems associated with that waterbody;
- the controllability of the problem, and

- the public benefit of the use or uses if restored.

Vermont's High Priority Targeted Impaired list of waters are also Vermont's Section 303(d) waters and are the focus for concerted management actions by the Department. The rate and order of targeted waterbodies receiving special management focus will be guided by the availability of financial and personnel resources and by the ability to execute implementation programs in a coordinated fashion.

The list of Section 303(d) waters is presented in Appendix E. The original Vermont 303(d) list was approved by EPA in 1993. The 1994 list approved by EPA in July 1994, has been updated and was the subject of two public meetings in February. The waterbodies scheduled to have control measures designed by April, 1996 have been enclosed by a box.

V. OTHER PROGRAMS

Programs for controlling 'natural' nonpoint pollution sources are offered through the two Resource Conservation and Development (RC&D) areas, the U.S. Army Corps of Engineers (COE), and the National Flood Insurance Program. Army COE can provide beach, streambank, and shoreline erosion protection measures under their *Continuing Authorities Program* where an identified and measurable threat to public works or services exists.

The *National Flood Insurance Program* for the state is administered by the Agency of Natural Resources to assist communities in securing flood insurance protection. Critical components of the program with respect to NPS pollution are the structural and nonstructural measures of prohibiting or managing development in the identified 100 year flood plain.

The *Connecticut River Watershed Advisory Commission*, established by Title 10, Chapter 45, subchapter 3 of the Vermont Statutes Annotated, cooperates with the New Hampshire Connecticut River Valley Resource Commission. The joint commissions are continuing a multi-year effort which is coordinating the work of federal, state, and regional planning agencies to do GIS mapping of river valley resources and attributes.

The joint commissions coordinate five bi-state local river subcommittees that meet monthly to advise on permits that affect the river and develop a river corridor management plan. Over 100 people serve on these subcommittees, and all are nominees of the selectboards of their communities. The joint commissions are also coordinating a joint assessment on the part of the Vermont and New Hampshire water quality agencies to produce a report on the status of clean water and the actions needed over the next few years.

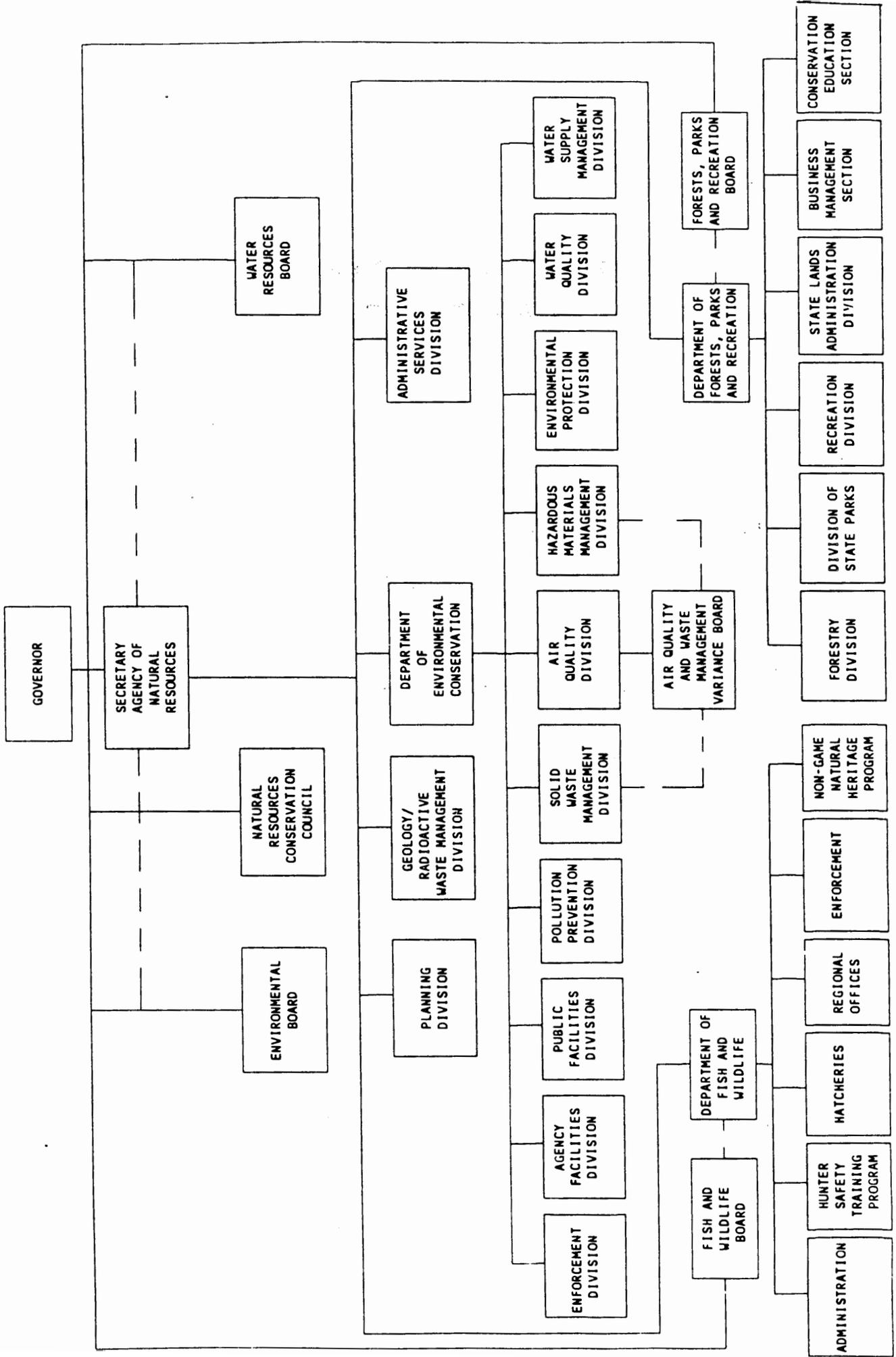
The joint commissions oversee a *Connecticut River Partnership Program* to make small grant awards to local communities and organizations for projects of outstanding merit that empower local initiative. The 1993 Partnership focused on youth involvement in river activities as well as initiatives in water quality monitoring, historic resource protection and river-oriented recreation.

APPENDIX A

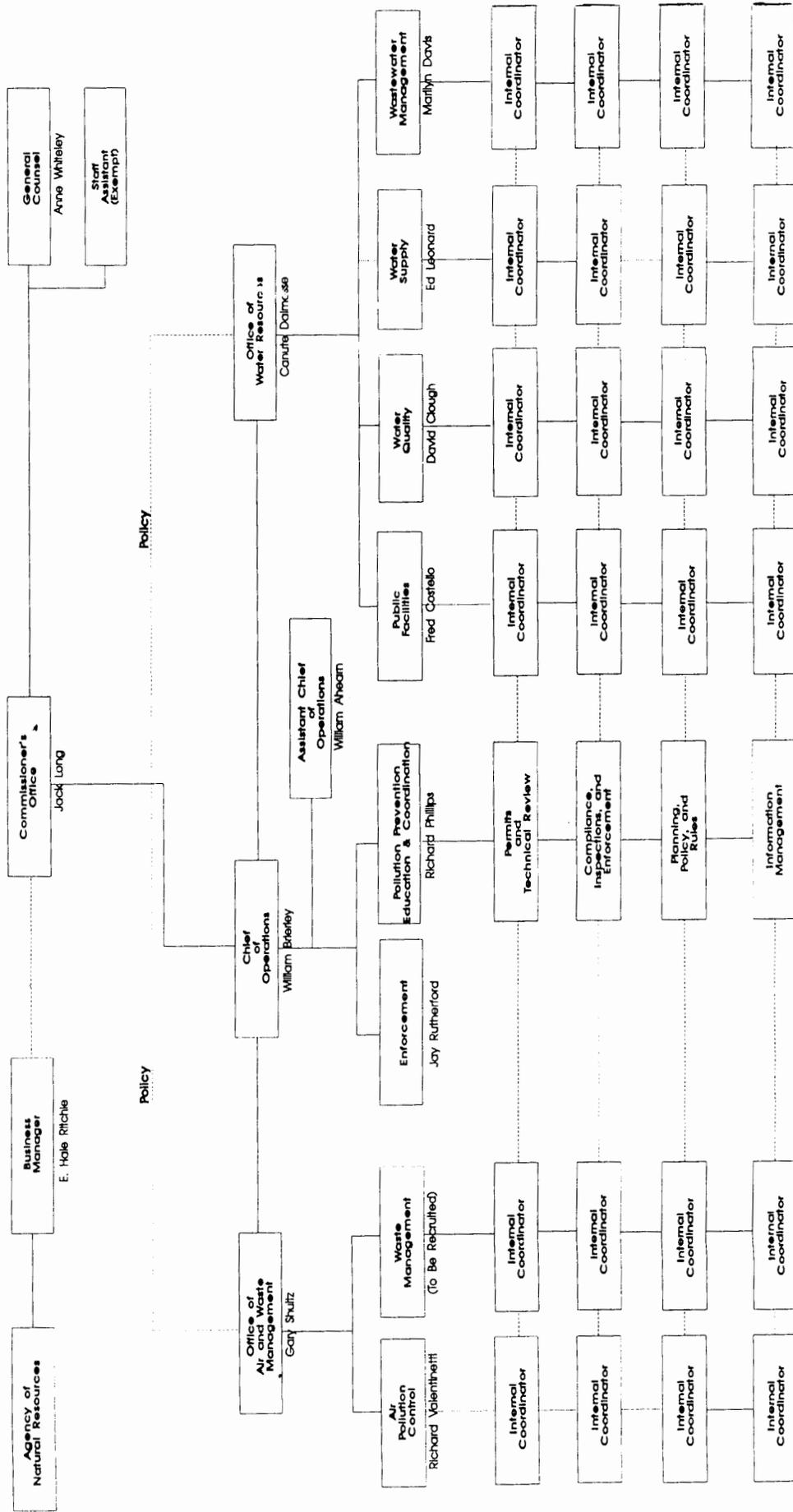
**Agency of Natural Resources and Department of Environmental Conservation
Organization Charts**

VERMONT AGENCY OF NATURAL RESOURCES

-ORGANIZATION CHART-



Vermont Department Of Environmental Conservation PROPOSED ORGANIZATIONAL CHART



APPENDIX B

Vermont Water Quality Standards

XXXXXXXXXXXXXXXXXXXX
XXXXXX Mailing Address: XXXXXXXX
XXXXXX 58 East State Street XXXXXXXX
XXXXXX Montpelier, VT 05620-3201 XXXXXXXX
XXXXXXXXXXXXXXXXXXXX



Location:
58 East State Street
Montpelier, Vermont

MAILING ADDRESS:
58 East State Street
Drawer 20
Montpelier, Vermont 05620-3201

**State of Vermont
Water Resources Board**

Tel.: (802) 828-2871

**VERMONT WATER QUALITY STANDARDS
Adopted July 12, 1994**

Effective August 1, 1994

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Chapter 1 GENERAL POLICY

Section 1-01 Applicability and Definitions

A. Applicability

1. Pursuant 10 V.S.A. Chapter 47, after the classification of any waters has been established those waters shall be managed by the Secretary in order to obtain and maintain the classification. The Secretary may enforce a classification and these rules against any person affected thereby who, with notice of the classification has failed to comply.
2. Concerning any application filed with the Secretary, the Water Quality Standards effective since May 27, 1991, shall apply to all applications that are filed before the effective date of these rules. These Water Quality Standards shall apply to those applications, including applications for the renewal of existing approvals, that are filed on or after the date upon which the amended standards become effective and to all other activities that occur after that date.

B. Definitions

For the purposes of these Water Quality Standards, the terms below shall have the following meanings unless a different meaning clearly appears from the context.

1. Accepted agricultural or silvicultural practices means those land management practices adopted by the commissioners of agriculture, food and markets and forests, parks and recreation respectively in accordance with applicable state law.
2. Act means the "Vermont Water Pollution Control Act," 10 V.S.A., Chapter 47.
3. Applicable water quality criteria means all criteria specified in §§ 3-01, 3-05, 3-06 as well as those specified in §§ 3-02(B), and 3-03(B) are applicable to the classification of the waters in question.
4. Application - means any request for a permit, certification or approval required by state or federal law filed with and deemed complete by the Secretary.
5. Aquatic biota means all organisms that spend all or part of their life cycle in or on the water.
6. Assimilative capacity means a measure of the capacity of the receiving waters to assimilate wastes without lowering their quality below the applicable water quality criteria.
7. Background conditions means conditions that exist in the absence of human or cultural influences or conditions due to human or cultural influences that are not subject to

regulation or management under the Act or under 6 V.S.A., Chapter 215.

8. **Basin Plan** means a plan prepared by the Secretary for each of Vermont's 17 basins (see Chapter 4 of these rules) in conjunction with the basin planning process required by § 303(e) of the Federal Clean Water Act and 40 CFR Part 131, 10 V.S.A. § 1251 (17).
9. **Beneficial values or uses** means any value or use, whether existing or not, that is specified in the management objectives for each class of water as set forth in §§ 3-02(A), and 3-03(A) of these rules.
10. **Best Management Practices** means a practice or combination of practices that may be necessary, in addition to any applicable Accepted Agricultural or Silvicultural Practices, to prevent or reduce pollution from nonpoint source wastes to a level consistent with the applicable provisions of these rules.
11. **Board** means the Vermont Water Resources Board, 10 V.S.A. § 1251(1).
12. **Classification** means the water quality classification designated for a specific body of water in accordance with the provisions of 10 V.S.A. § 1253.
13. **Discharge** means the placing, depositing, or emission of any wastes, directly or indirectly, into an injection well or into the waters of the State, 10 V.S.A. § 1251(2).
14. **EPA** means the U.S. Environmental Protection Agency.
15. **Existing discharge** means any discharge to the extent authorized by a valid permit issued under the provisions of 10 V.S.A. § 1263 or § 1265 as of January 7, 1985.
16. **Existing use or existing water use** means those uses which have actually occurred on or after November 28, 1975, in or on a water body whether or not the uses are included in the standard for classification of the particular water body.
17. **Groundwater** means water below the land surface, 10 V.S.A. § 1410 (b)(1).
18. **Indirect discharge** means any discharge to groundwater, whether subsurface, land-based or otherwise, 10 V.S.A. § 1251(15).
19. **Low Median Monthly Flow** means the median monthly flow for that month with the lowest median monthly flow.
20. **Median monthly Flow** means the median flow for each calendar month computed by ranking daily flows and selecting the

middle value.

21. **Median Annual Flow** means that mean daily flow which is equalled or exceeded 50 percent of the time.
22. **Mixing zone** means a length or area within the waters of the state required for the dispersion and dilution of waste discharges adequately treated to meet federal and state treatment requirements and within which it is recognized that specific water uses or water quality criteria associated with the assigned classification for such waters may not be realized. The mixing zone shall not extend more than 200 feet from the point of discharge, 10 V.S.A. § 1251(6).
23. **New Discharge** means any discharge not authorized under the provisions of 10 V.S.A. § 1263 as of January 7, 1985 or any increased pollutant loading or demand on the assimilative capacity of the receiving waters from an existing discharge that requires the issuance of a new or amended permit.
24. **Nonpoint source waste** means waste that reaches the waters of the state via direct or indirect discharge in a diffuse manner from sources including, but not limited to, overland runoff from construction sites, or as a result of agricultural or silvicultural practices.
25. **Nonpolluting waste** means wastes that prior to treatment does not have the potential to result in an undue adverse effect on any existing use, beneficial value or use, or the quality of the receiving waters.
26. **Permit** means a Discharge Permit issued in accordance with the provisions of 10 V.S.A. § 1263 and any other permit issued by the Secretary or the Commissioner of the Department of Environmental Conservation that affect water quality.
27. **Person** means an individual, partnership, public or private corporation, municipality, institution, or agency of the state or federal government, including any officer or governing or managing body of a partnership, association, firm or corporation, 10 V.S.A. § 1251(8).
28. **Public Interest** means that which shall be for the greatest benefit to the people of the state as determined by the Board in accordance with the criteria set forth in subsection (e) of § 1253 of the Act.
29. **Publicly owned treatment works** means any government owned device or system used in the storage, treatment, disposal or recycling of wastes.
30. **Receiving waters** means all waters adjacent to a discharge

and all adjacent or downstream waters whose quality may be affected by that discharge.

31. **Seven Day Low Flow, Ten Year Return Period (7Q10)** means that instantaneous flow equal to the lowest mean flow for seven consecutive days that has a 10% chance of occurring in any given year.
32. **Secretary** means the Secretary of the Agency of Natural Resources or the Secretary's duly authorized representative.
33. **Stormwater runoff** means natural precipitation that does not infiltrate into the soil, including any material dissolved or suspended in such water. Stormwater runoff does not include wastes from combined sewer overflows.
34. **Toxic wastes** means those wastes or combinations of wastes which, after discharge and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will, on the basis of available information cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological or reproductive malfunctions or physical deformations in such organisms or their offspring.
35. **Undue Adverse Effect.** This phrase shall have its common meaning. In determining undue adverse effect, the Secretary is authorized to make case specific judgements in applying these rules. In making such judgments, the water quality policy set forth in § 1-02, the classification of the waters and any other applicable provisions of these rules shall be considered. Except where the context clearly indicates otherwise, applications or interpretations that are less stringent than the specific provisions of these rules shall not be allowed.
36. **Waste** means effluent, sewage, or any substance or material, liquid, gaseous, solid or radioactive, including heated liquids, whether or not harmful or deleterious to waters, 10 V.S.A. § 1251(12).
37. **Waste Management Zone** means a specific reach of Class B waters designated by a permit to accept the discharge of properly treated wastes that prior to treatment contained organisms pathogenic to human beings. Throughout the receiving waters, water quality criteria must be achieved but increased health risks exist due to the authorized discharge, 10 V.S.A. § 1251(16).
38. **Waters and Waters of the State** means any river, stream, creek, brook, reservoir, pond, lake, spring and any body of surface water, artificial or natural, which is contained within, flows through or borders upon the State of Vermont or any portion thereof. 10 V.S.A. § 1251(13)

C. Management of waters of the state

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Act (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the State. This exclusion applies only to man-made bodies of water which neither were originally created in the waters of the State (such as disposal area in wetlands) nor resulted from the impoundment of waters of the State.

Section 1-02 General Policy

A. Water Quality Policy 10 V.S.A. § 1250

It is the policy of the State of Vermont to:

1. protect and enhance the quality, character and usefulness of its surface waters and to assure the public health;
2. maintain the purity of drinking water;
3. control the discharge of wastes to the waters of the State, prevent degradation of high quality waters and prevent, abate or control all activities harmful to water quality;
4. assure the maintenance of water quality necessary to sustain existing aquatic communities;
5. provide clear, consistent and enforceable standards for the permitting and management of discharges;
6. protect from risk and preserve in their natural state certain high quality waters including fragile high-altitude waters, and the ecosystems they sustain;
7. manage the waters of the State to promote a healthy and prosperous agricultural community, to increase the opportunities for use of the state's forest, parks and recreational facilities, and to allow beneficial and environmentally sound development.

It is further the policy of the state to seek over the long term to upgrade the quality of waters and to reduce existing risks to water quality.

B. Basin Planning

The Secretary is required by federal law to adopt basin plans. Such plans inventory the causes and sources of pollution that impair, or threaten to impair, beneficial values and uses of the waters. In addition basin plans establish a strategy to improve or restore the values and uses consistent with the waters classification under these rules. The Secretary is required by

state law to revise all 17 basins plans by January 1, 2000. At least one basin plan shall be completed per year beginning in 1992. As part of the basin planning process, public participation is sought to identify problems and solutions of high public interest. Basin plans serve as the guide for how various sources of pollution within each basin will need to be managed to achieve compliance with the Vermont Water Quality Standards and the Vermont water quality policy (10 V.S.A. § 1250).

Each basin plan will identify strategies by which to allocate levels of pollution between various sources as well as between individual discharges. Agricultural and silvicultural nonpoint source discharges are presumed to be in compliance with these rules so long as they are following accepted management practices as promulgated by the Commissioners of Agriculture, Food and Markets and Forest, Parks and Recreation.

Section 1-03. Anti-Degradation Policy

A. General Policy

The Board shall establish water quality classifications in accordance with the statutory provisions of the Act and in a manner consistent with §§ 1-02 and 1-03 of these rules. To the greatest extent possible the classification of the waters shall identify existing uses, background conditions, and the degree of water quality to be obtained and maintained. Existing water quality classifications shall be maintained unless the Board, after a public hearing, finds that they are contrary to the public interest except as provided for in 10 V.S.A. § 1253(f).

Those waters whose quality meets or exceeds the water quality criteria specified in §§ 3-01, 3-03, and 3-05 of these rules and whose quality makes an important contribution to the propagation or survival of any beneficial species of aquatic biota at any period in their life history within any of the 17 planning basins identified in Chapter 4 of these rules, constitute high quality waters that have significant ecological value and therefore are eligible for reclassification to Class A in accordance with the provisions of 10 V.S.A. §§ 1253(c) and 1253(f).

The aquatic biota shall be considered to have been significantly altered whenever a discharge or combination of discharges results in a change in the number or diversity of aquatic biota that exceeds the range of natural variation within the receiving waters where such a change results in a measurable alteration of the essential biological characteristics of the receiving waters. The natural variation of aquatic biota shall be determined by sampling and statistical protocols established by the Secretary as provided for in § 2-01(f) of these rules. The waters of the State shall be managed in accordance with the Water Quality Standards to protect, maintain and improve water quality in such a manner that the beneficial values and uses

associated with their classification are attained. All waters, except mixing zones, shall be managed so that, at a minimum, a level of water quality compatible with all beneficial values and uses associated with the assigned classification are obtained and maintained.

B. Protection of Existing Uses

1. General

Existing water uses and the level of water quality necessary to protect those existing uses shall be maintained and protected. Existing water uses are those uses which have actually occurred on or after November 28, 1975, in or on a water body whether or not the uses are included in the standard for classification of the particular water body. Determinations of what constitutes an existing water use on a particular water body shall be made on a case-by-case basis by the Secretary. In making a determination of the uses to be protected and maintained, the Secretary shall consider the beneficial values or uses for that water body and:

- a. Fish and aquatic life present in the water body;
- b. Wildlife that utilize the water body;
- c. Habitat, including wetlands, within a water body supporting existing populations of fish, aquatic life, wildlife, or plant life that is maintained by the water body;
- d. The use of the water body for recreation in or on the water, fishing, water supply, or commercial activity that depends directly on the preservation of an existing level of water quality. Use of the water body to receive or transport discharges of waste is not considered an existing use for purposes of this anti-degradation policy; and
- e. Any other evidence which, for paragraph (a), (b) and (c) above, demonstrates their ecological significance because of their role or importance in the functioning of the ecosystem or their rarity and, for paragraph (d) above demonstrates its historical or social significance.

2. Discharge Permits and Water Quality Certifications

The Secretary may only issue a discharge permit pursuant to 10 V.S.A. § 1263, or approve a water quality certification pursuant to the United States Clean Water Act, Section 401, Public Law 92-500, as amended, when the Secretary finds that:

- a. The existing water use involves use of the water body by aquatic biota, fish or wildlife, and the proposed activity would not have a significant impact on those values. For purpose of this provision, significant impact means: Impairing the viability of the existing population, including significant impairment to growth and reproduction or an alteration of the habitat which impairs viability of the existing population; or
- b. Where the existing water use involves use of the water body for recreation in or on the water, fishing, water supply or commercial enterprises that depend directly on the preservation of an existing level of water quality, the proposed activity would not result in significant degradation of the existing use.

C. Protection of High Quality Waters

For all waters where the existing quality generally exceeds any of the applicable water quality criteria specified in Chapter 3 of these rules that high quality shall be maintained and protected in the public interest to the fullest extent possible in accordance with the provisions of this section.

- 1. Consistent with the requirements set forth in subsection C(2) below, a limited reduction in the higher quality of such waters may be allowed only when it is shown that:
 - a. The adverse economic or social impacts on the people of the state specifically resulting from the maintenance of the higher quality of the waters are substantial and widespread, and
 - b. Such adverse impacts are not warranted by the economic, social and other benefits to the people of the state resulting from the maintenance of such a higher level of water quality.
- 2. Any decision to allow a limited reduction in high quality waters shall be consistent with the following requirements:
 - a. Only that degree of reduction in the higher quality waters that is necessary to comply with the above criteria, shall be allowed, and
 - b. That degree of water quality necessary to maintain and protect all existing uses as well as all applicable water quality criteria of the receiving waters shall be maintained.

D. Protection of Outstanding Resource Waters

The Board may under 10 V.S.A. § 1424a designate certain waters as Outstanding Resource Waters. Where the Board so designates such waters because of their water quality values, their existing high quality shall be protected and maintained.

E. Indirect Discharges of Sewage

The anti-degradation requirements of this rule shall be satisfied whenever the Secretary finds that a proposed indirect discharge of sewage into a Class B body of water:

1. will not significantly alter the aquatic biota in the receiving waters, and
2. will not pose more than a negligible risk to public health, and
3. will be consistent with existing and potential beneficial uses of the waters, and
4. will not cause a violation of the water quality standards.

Section 1-04. Discharge Policy

A. Discharge Criteria

In addition to the other provisions of these rules, new discharges of wastes may be allowed only when all the following criteria are met:

1. The proposed discharge is in conformance with all applicable provisions of these rules including the classification of the receiving waters adopted by the Board as set forth in Chapter 4 of these rules.
2. There is no alternative method of, or location for, waste disposal that would have a lesser impact on water quality including the quality of groundwater, or if there is such an alternative method or location, it would be clearly unreasonable to require its use.
3. The design and operation of any waste treatment or disposal facility or the use of land management practices required under 6 V.S.A. Chapter 215 or Section 2-04 of these rules is adequate and sufficiently reliable to protect all beneficial values and uses and to insure compliance with these rules and with all applicable state and federal treatment requirements and effluent limitations.
4. Except as provided for in 10 V.S.A. § 1259(d) and (f), the discharge of wastes other than nonpolluting wastes and stormwater runoff is prohibited in Class A waters regardless of the degree of treatment provided.
5. Except as provided for in 10 V.S.A. § 1259 the discharge of wastes that, prior to treatment, contained organisms

pathogenic to human beings into Class A or Class B waters is prohibited.

6. The receiving waters will have sufficient assimilative capacity to accommodate the proposed discharge.
7. Assimilative capacity has been allocated to the proposed discharge consistent with the classification in Chapter 4 of these rules.
8. The withdrawal of water from, or the discharge of wastes to the thermocline or hypolimnion of any lake in a manner that may result in an undue adverse effect on any existing use or on any beneficial value or use is prohibited.
9. The indirect discharge of sewage into Class B waters will not pose more than a negligible risk to public health. Compliance with this criterion shall include an assessment of both the level and reliability of treatment achieved and the impact of the discharge on the water quality of the receiving waters.

B. Assimilative Capacity

The capacity of the waters of the State to assimilate both the discharge of wastes and the impact of other activities that may adversely affect water quality, and at the same time to be maintained at a level of water quality that is compatible with their classification, is finite. A portion of the assimilative capacity may be held in reserve to provide for future needs, including the abatement of future sources of pollution and future social and economic development.

Accordingly, the assimilative capacity of the waters of the State shall be carefully allocated in accordance with the "Wasteload Allocation Process" as adopted by the Secretary.

Section 1-05. Interpretation

Formal interpretation of these rules may be obtained by a request for either an advisory opinion regarding the applicability of any provision of these rules from the Board's Executive Officer or a declaratory ruling from the Board as provided for in the Board's Rules of Procedure. Informal interpretations by the Secretary and advisory opinions by the Executive Officer may be brought to the Board by means of a petition for a declaratory ruling by any person demonstrating a stake in the outcome.

Declaratory rulings by the Board may be appealed to the Vermont Supreme Court under the provisions of 3 V.S.A. § 808.

Chapter 2 APPLICATION OF STANDARDS

Section 2-01 Sampling and Analysis

All numeric water quality criteria shall be applied by rounding to the nearest significant number in accordance with standard mathematic practice. For the purposes of these rules, sample collection, preservation, handling and analysis shall conform as closely as practicable to methods established in the most current edition or publication of any of the following sources:

- (a) "Standard Methods For the Examination of Water and Wastewaters," Public Health Association, New York.
- (b) "American Society For Testing and Materials," part 23, "Water; Atmospheric Analysis," American Society For Testing and Materials.
- (c) "Methods For Chemical Analysis of Water and Wastes," U.S. Environmental Protection Agency.
- (d) "Microbiological Methods for Monitoring the Environment - Water and Wastes," U.S. Environmental Protection Agency.
- (e) The "Quality Assurance Program and Project Plan" prepared by the Secretary and as approved by EPA.
- (f) Any applicable practice or procedure adopted by the Secretary under the provisions of 3 V.S.A. § 835 or any rule adopted as part of the "Vermont Water Pollution Control Permit Regulations" under the provisions of 3 V.S.A. § 836.

Section 2-02 Hydrology

A. Natural Flow Conditions

Where the natural flow regime is not controlled or substantially influenced by man-made structures or devices, compliance with the applicable water quality criteria shall be calculated on the basis of 7Q10 flow values unless another flow value is specified in Section 3 of these rules. This rule shall not be construed to allow less than normal design operation of any treatment facility during periods of low stream flow or to otherwise waive the terms of any permit issued under the Act.

B. Artificial Flow Conditions

The flow of waters shall not be controlled or substantially influenced by man-made structures or devices in a manner that would result in an undue adverse effect on any existing use, beneficial value or use or result in a level of water quality that does not comply with these rules. The Secretary shall cooperate with appropriate federal, state and private interests in achieving voluntary agreements regarding the maintenance of those minimum flows or when necessary require minimum flows as provided for in 10 V.S.A. § 1003 to protect the beneficial values

and uses associated with the classification of the receiving waters.

For waters whose natural flow regime is controlled by man-made structures and where there is a minimum flow agreement/requirement, compliance with the applicable water quality criteria shall be calculated on the basis of 7Q10 flow values, unless another flow value is specified in Section 3 of these rules, or the agreed/required minimum flow whichever is less.

In the absence of a minimum flow agreement/requirement, the water quality criteria shall apply at the absolute low flow resulting from flow regulation, or 7Q10, whichever is less.

Section 2-03 Mixing Zones

A. Designation

Mixing zones shall not be created in any Class A water. In Class B waters the Secretary may, in conjunction with the issuance of a permit, designate a specific portion of the receiving waters not exceeding 200 feet from the point of discharge as a mixing zone for any waste that has been properly treated to comply with all applicable state and federal treatment requirements and effluent limitations. Within any mixing zone the Secretary may, in accordance with the terms of a permit, waive the provisions of §§ 1-03, 3-01, and 3-03(B), provided that the quality of the waters downstream of the mixing zone complies with all applicable provisions of these rules.

B. Mixing Zone Criteria

The Secretary shall insure that conditions within any mixing zone shall:

1. Not create a public health hazard, and
2. Not constitute a barrier to the passage or migration of fish or result in an undue adverse effect on fish, aquatic biota or wildlife, and
3. Not interfere with any existing use of the waters.

Section 2-04. Nonpoint Source Wastes, Investigations Studies or Scientific Research

A. Nonpoint Source Discharges

It is the policy of the State of Vermont to recognize that certain wastes from nonpoint sources including, but not limited to those from agricultural or silvicultural practices are of such a nature that strategies developed in the basin planning process represent a practicable basis for achieving compliance with these rules when required by the Act or by 6 V.S.A. Chapter 215. The requirements of these rules for discharges of any nonpoint source

wastes shall be presumed to be satisfied when the activity producing the discharge:

1. Is conducted in accordance with accepted agricultural or silvicultural practices, or appropriate management practices, adopted for activities other than agriculture or silviculture; and
2. Does not result in an undue adverse effect on any beneficial value or use or result in irreversible damage to the waters of the State; and
3. Is consistent with the strategy for managing nonpoint source wastes within any applicable basin plan.

In implementing this policy, the Secretary and the Commissioner of the Department of Agriculture, Food and Markets are encouraged to exercise the full range of discretion authorized by the Act and 6 V.S.A. Chapter 215 and to manage discharges of nonpoint source wastes in as cost-effective a manner as possible consistent with the provisions of these rules. Where required, monitoring to determine compliance with water quality criteria shall occur in-stream at a point 200 feet downstream from the nearest point of discharge for nonpoint source wastes.

B. Limited Duration Activities

1. Regulated Activities

It is the policy of the State of Vermont to recognize that certain activities of limited duration, that can adversely affect water quality are subject to regulation under other Vermont statutes that control impacts on water quality. In no event shall the activity create an undue adverse effect on the beneficial values and uses of the receiving waters. Accordingly, the Secretary may manage dredging, the placement of fill or other limited duration activities through permits issued under one or more of the following authorities to assure maintenance of the beneficial values and uses as provided in these rules:

- (a) 29 V.S.A., Chapter 11 "Management of Lakes and Ponds"
- (b) 10 V.S.A. § 1263a "Aquatic Nuisance Control Permits"
- (c) 10 V.S.A., Chapter 41 "Alteration of Streams"
- (d) 10 V.S.A., Chapter 43 "Dams"
- (e) 10 V.S.A., Chapter 151 "Land Use and Development" ("Act 250")

The provisions of this subsection shall not authorize any discharge or activity adversely affecting water quality that occurs on an on-going basis that continues for more than the

lesser of 90 days or exceeds the length of time for the completion of the activity authorized under the laws specified above.

2. Investigations, Studies or Scientific Research

The Secretary may, by written authorization, waive the requirements of these rules in order to conduct investigations, studies, or scientific research which the Secretary considers to be necessary either for the proper administration of the Act or for the protection or management of the waters of the State of Vermont. Any such activity must not cause an undue adverse effect on any beneficial value or use or irreversible damage to the waters of the State.

Section 2-05 Stormwater Management

In accordance with the provisions of 10 V.S.A. § 1264, it is the policy of the State of Vermont that these rules be implemented in a manner that recognizes the inherent differences between the discharge of stormwater runoff and other discharges.

In implementing this policy, the Secretary is encouraged to exercise the full range of discretion authorized by the Act and shall manage discharges of stormwater runoff in as cost effective a manner as possible, consistent with these rules and any applicable basin plan.

Section 2-06 Waste Management Zones

A. Designation

The designation of waste management zones is provided for in 10 V.S.A. § 1252(b)-(d). In Class B waters the Secretary may, in conjunction with the issuance of a permit for the direct discharge of properly treated wastes that prior to treatment contained organisms pathogenic to human beings, designate a specific portion of the receiving waters as a waste management zone when the criteria in subsection B of this section are met. Waste management zones shall not be created in any Class A water.

B. Waste Management Zone Criteria

The Secretary shall insure that, in addition to complying with all other applicable provisions of the statute and these rules, any waste management zone meets the following criteria:

1. It shall be the minimum length necessary to accommodate the authorized discharge.
2. It shall be consistent with the anti-degradation policy (Section 1-03) of these rules, including but not limited to the provisions of that policy pertaining to the maintenance and protection of all existing and beneficial values and uses.

3. It shall not create a significantly increased risk to public health within the zone.
4. It will be located and managed so as to not result in more than a negligible increased risk to public health adjacent to or downstream of the waste management zone.
5. It will not constitute a barrier to the passage or migration of fish or result in an undue adverse effect on fish, aquatic biota or wildlife.

Chapter 3 DETERMINATION OF CRITERIA

Section 3-01 Water Quality Criteria - General

A. Limited Waiver of Water Quality Criteria

1. Background Conditions

In those waters where background conditions result in an in-stream level of water quality below any applicable water quality criterion established in this chapter, maintenance of the in-stream background condition may be allowed when specifically authorized by the terms of a permit, provided that the quality of the receiving waters is not reduced.

2. Small Streams

In streams with a drainage basin of less than 300 acres, the water quality criteria for dissolved oxygen, temperature, ammonia, nitrates and chlorine shall not apply where the Secretary determines that significant aquatic biota and fishery values are never present at any time during the year due to natural conditions.

B. General Criteria

Except as provided for in § 3-01(A), the following water quality criteria shall be achieved as in-stream conditions in all waters, except mixing zones, regardless of their classification:

1. Dissolved Oxygen

- a. Cold Water Fish Habitat - Not less than 7 mg/l or 75 percent saturation at all times, nor less than 95 percent saturation during late egg maturation and larval development of salmonoids in areas that the Secretary determines are salmonoid spawning or nursery areas important to the establishment or maintenance of the fishery resource. Not less than 6 mg/l or 70 percent saturation at all times in all other waters designated as a cold water fish habitat.

- b. Warm Water Fish Habitat - Not less than 5 mg/l or 60 percent saturation at all times.

2. Temperature

a. General

The change or rate of change in temperature, either upward or downward, shall be controlled so as to prevent any undue adverse effect on aquatic biota and wildlife.

b. Cold Water Fish Habitat

The total increase in temperature from background conditions due to all discharges and activities shall not at any time exceed 1.0°F except as provided for in paragraph (d) below.

c. Warm Water Fish Habitat

The total increase in temperature from background conditions due to all discharges and activities shall not at any time exceed the values derived from tables 1 or 2 except as provided for in paragraph (d) below.

Table 1. Rivers, Streams, Brooks and Creeks

<u>Background temperature</u>	<u>Total allowable increase above background temperature</u>
Above 66°F.	1°F.
63° to 66°F.	2°F.
59° to 62°F.	3°F.
55° to 58°F.	4°F.
Below 55°F.	5°F.

Table 2. Lakes, Ponds, Reservoirs and other waters

<u>Background Temperature</u>	<u>Total allowable increase above background temperature</u>
Above 60°F.	1°F
50°F - 60°F.	2°F
Below 50°F.	3°F

d. Assimilation of Thermal Wastes

The Secretary may, by permit condition, specify temperature criteria that exceed the values specified above in order to authorize discharges of thermal wastes when it is shown that:

- (1) The discharge will comply with all other applicable provisions of these rules.
- (2) A mixing zone of 200 feet in length is not adequate to provide for assimilation of the thermal waste.
- (3) After taking into account the interaction of thermal effects and other wastes, that the higher temperature will not result in thermal shock or have an undue adverse effect on aquatic biota, fish or wildlife or any beneficial values or uses associated with the classification of the receiving waters.

3. Phosphorus

a. All waters - general policy

There shall be no increase, in any waters, of total phosphorus above background conditions that may contribute to the acceleration of eutrophication or the stimulation of the growth of aquatic biota in a manner that has an undue adverse effect on any beneficial values or uses of any adjacent or downstream waters.

b. Upland Streams

In addition to compliance with the general policy above, for all streams above 2,500 feet in elevation total phosphorus shall not exceed 0.010 mg/l at low median monthly flow.

c. Lake Champlain and Lake Memphremagog

In Lake Champlain and Lake Memphremagog, there shall be no significant increase over currently permitted phosphorus loadings. "No significant increase" may be defined by the Secretary as part of the applicable basin plan to allow new or increased discharges of phosphorus when the permit for such discharges provides for a corresponding reduction in phosphorus loadings from other sources to the lake segment in question.

Compliance with implementation measures adopted or approved by the Secretary as part of a basin plan reasonably designed to achieve these criteria by January 1, 1998, shall be considered compliance with the criteria for all purposes.

All discharges into each of the lake segments identified below, or into tributaries within the planning basin, shall comply with permit limitations and any other measure adopted or approved by the

Secretary in furtherance of a plan reasonably designed to achieve the following criteria by January 1, 1998:

<u>Lake Segment (see Appendix B)</u>	<u>Phosphorus Criterion</u>
<u>Lake Champlain</u>	
Main Lake	0.010 mg/l as P
Malletts Bay	0.010 mg/l
Burlington Bay	0.014 mg/l
Shelburne Bay	0.014 mg/l
Northeast Arm	0.014 mg/l
Isle La Motte	0.014 mg/l
Otter Creek	0.014 mg/l
Port Henry	0.014 mg/l
St. Albans Bay	0.017 mg/l
Missisquoi Bay	0.025 mg/l
South Lake A	0.025 mg/l
South Lake B	0.054 mg/l
<u>Lake Memphremagog</u>	
Main Lake	0.014 mg/l
South Bay	0.025 mg/l

The above criteria shall be achieved as the summer (June-August) mean total phosphorus concentration in the photosynthetic depth (euphotic) zone in central, open water areas of each lake segment in accordance with basin plans and wasteload allocations adopted by the Secretary not later than January 1, 1998.

- d. Lakes or ponds that have drainage areas of less than 40 square miles and a drainage area to surface area ratio of less than 500 and their tributaries.

In addition to compliance with the general policy above, there shall be no significant increase over background conditions in total phosphorous. Discharges to tributaries which do not increase in-stream background conditions by more than 0.001 mg/l at low median monthly flow, or discharges to lakes or ponds which do not increase total phosphorous as measured in the groundwater 100 feet from the mean water level of the lake or pond by more than 0.001 mg/l will be presumed to meet this requirement.

The Secretary may as part of the applicable basin plan define "no significant increase" to allow new or increased discharges of phosphorus on and after January 1, 1994, when the permit for such discharges provides for a corresponding reduction in phosphorus loadings to the receiving waters in question.

4. **Nitrates**

a. **Rivers, streams, brooks and creeks**

- (1) Not to exceed 0.20 mg/l, as nitrate-nitrogen (NO_3^- -N) at flows exceeding low median monthly flows, in Class A waters above 2,500 feet altitude, National Geodetic Vertical Datum.
- (2) Not to exceed 2.0 mg/l as NO_3^- -N at flows exceeding low median monthly flows, in Class A waters at or below 2,500 feet altitude, National Geodetic Vertical Datum.
- (3) Not to exceed 5.0 mg/l as NO_3^- -N at flows exceeding low median monthly flows, in Class B waters.

b. **Lakes, Ponds and Reservoirs**

Not to exceed 5.0 mg/l as NO_3^- -N regardless of classification.

In addition to the above numeric criteria, there shall be no increase of nitrates in any waters above background conditions that would contribute to the acceleration of eutrophication, or the stimulation of the growth of aquatic biota, in a manner that has an undue adverse effect on any beneficial values or uses of any adjacent or downstream waters.

5. **Aquatic Habitat** - No change from background conditions that would have an undue adverse effect on the composition of the aquatic biota, the physical or chemical nature of the substrate or the species composition or propagation of fishes.
6. **Sludge deposits or solid refuse** - None
7. **Settleable solids, floating solids, oil, grease, scum, or total suspended solids** - None in such concentrations or combinations that would have an undue adverse effect on any beneficial values or uses.
8. **Alkalinity** - Not less than 20 mg/l as CaCO_3 .
9. **pH** - Values shall be maintained within the range of 6.5 and 8.5. The change, or rate of change, either upward or downward shall not result in an undue adverse effect on aquatic biota, fish or wildlife.
10. **Toxic substances**
 - a. **General**

Where necessary to protect an existing or

reasonably anticipated beneficial use the waters of the State shall be managed to prevent the discharge of toxic substances in concentrations, quantities or combinations that based on the beneficial values and uses associated with the classification of the receiving waters, exceed:

- (1) For toxic substances that are carcinogenic, a maximum individual lifetime risk to human health greater than 10^{-6} , or
- (2) For toxic substances that are noncarcinogenic, a maximum individual life time risk of no adverse effect to human health, or
- (3) Acute or chronic toxicity to aquatic biota, fish or wildlife.

The Board must reconsider these criteria and revise them if necessary at least every three years following the effective date.

b. Human health based criteria

The human health based toxic pollutant criteria listed in Appendix C shall apply at the median annual flow.

c. Aquatic biota based criteria

The aquatic biota based toxic pollutant criteria that result in acute or chronic toxicity listed in Appendix D shall apply at 7Q10 flows.

d. Other toxic substances

Where numeric criteria for a toxic substance are not established by these rules, the Secretary may establish such criteria consistent with general policy in subsection (a.) above, based on the procedures set forth in the Vermont Toxic Discharge Control Strategy (1994).

In establishing such limits the Secretary shall give consideration to the potential for bio-accumulation as well as any antagonistic or synergistic relationship that may exist between the wastes being discharged and the concentration of other wastes or constituents in the receiving waters.

In implementing these criteria, the Secretary should to consider the full range of discretion authorized by the Act and to apply these criteria in as cost effective a manner as possible consistent with the provisions of this subsection.

- e. Notwithstanding subsection (a.), if the concentration of a toxic pollutant in any discharge is less than the limit of detection as determined by the Secretary, the toxic pollutant criterion shall be considered not to have been exceeded for that pollutant. The Secretary shall determine the limit of detection based on reasonably available protocols and technology. The Secretary shall adopt a process, through notice and comment rulemaking, by which permit applicants may demonstrate that toxic pollutants, in any discharge which cannot be monitored routinely by reasonably available protocols and technology, will not exceed the water quality criteria. In any case where an applicant cannot make such a demonstration, the process shall also provide for management practices that give reasonable assurance the standards will not be exceeded.

11. Radioactive Substances

The waters of the State shall be managed so as to prevent the discharge of radioactive substances in concentrations, quantities or combinations that may create a significant likelihood of an adverse impact on human health or a risk of acute or chronic toxicity of aquatic biota, fish or wildlife. Unless otherwise required by these rules, the Secretary shall determine limits for discharges containing radioactive substances based on the results of biological toxicity assessments and the appropriate available scientific data, including but not limited to:

- (a) The Vermont State Health Regulation, Part 5, Chapter 3 "Radiological Health," effective as of 12/10/77
- (b) 10 CFR 50, Appendix I

The discharge of radioactive substances shall not exceed the lowest limits which are reasonably achievable.

Section 3-02 Class A Waters

A. Management Objectives

To achieve and maintain waters with a very high level of water quality that is compatible with the following beneficial values and uses:

1. **Values** - High quality waters that have significant ecological value and water quality of a uniformly excellent character.
2. **Uses** - As a source of public water supply with disinfection when necessary and, when compatible, for the enjoyment of water in its natural condition.

B. Water Quality Criteria for Class A Waters

Except as provided for in § 3-01(A), the following water quality criteria shall be achieved as in-stream conditions in all Class A waters.

1. **Turbidity** - Not to exceed 10 NTU or background conditions, whichever is lower.
2. **Escherichia coli** - Not to exceed 18 organisms/100 ml or background conditions whichever is lower. None attributable to the discharge of wastes.
3. **Color** - No increase from background conditions.
4. **Tastes and Odor** - No increase from background conditions.

Section 3-03. Class B Waters

A. Management Objectives

Class B waters shall be managed to achieve and maintain a high level of quality, that is compatible with the following beneficial values and uses:

1. **Values** - Water of a quality that consistently exhibits good aesthetic value and provides high quality habitat for aquatic biota, fish and wildlife.
2. **Uses** - Public water supply with filtration and disinfection; irrigation and other agricultural uses; swimming, and recreation.

B. Water Quality Criteria for Class B Waters

Except as provided for in § 3-01(A) the following water quality criteria shall be achieved as in-stream conditions in all Class B waters, except mixing zones.

1. **Turbidity**
 - a. **Cold Water Fish Habitat** - Not to exceed 10 NTU.
 - b. **Warm Water Fish Habitat** - Not to exceed 25 NTU.
2. **Escherichia coli** - Not to exceed 77 organisms/100 ml except that the Secretary may, by permit condition, waive compliance with this criterion during all or any portion of the period between October 31, and April 1, provided that a health hazard is not created. The Secretary shall provide written notice to the Vermont Department of Health prior to issuing a permit waiving compliance with the Escherichia coli criterion.
3. **Color** - Not to exceed 25 standard color units.

4. Taste and Odor - None in such concentrations that would have an undue adverse effect on beneficial values or uses or on the taste or odor of fish.

Section 3-04 Fish Habitat Designation

To provide for the protection and management of fisheries, the waters of the State are designated in Appendix A as being either a cold or a warm water fish habitat. Where appropriate, such designations may be seasonal.

Chapter 4 WATER QUALITY CLASSIFICATIONS The classification of all waters has been established by a combination of legislative acts and by classification or reclassification decisions issued by the Board pursuant to 10 V.S.A. § 1253. Those waters reclassified by the Board to Class A shall include all waters within the entire watershed of the reclassified waters unless expressly provided otherwise in the rule. Watershed shall mean that region which contains waters that drain into a particular brook, stream, river, or other body of water.

Section 4-01. Classification of the Batten Kill Walloomsac and Hoosic Basin (Basin 1)

All waters within this basin are Class B except as provided for below:

A. Batten Kill

<u>Waters</u>	<u>Class</u>	<u>Date</u>	<u>Approx. Miles/Acres</u>
An unnamed tributary to Bromle Brook	A	6/30/64	0.5 mile

Description

Village of Manchester water supply (No longer used). The first unnamed tributary to Bromley Brook and all waters within its watershed upstream of the Manchester Water Co. intake. The tributary is the first tributary on the right upstream of Bromley Brook's confluence with Bourn Brook. The intake is approximately 0.5 mile upstream of its juncture with Bromley Brook.

B. Walloomsac River

Basin Brook and Furnace Brook	A	12/23/52	5.0 miles
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Village of North Benning water supply. Basin Brook and all waters within its watershed to and including the North Bennington Reservoir in the Towns of Glastenbury and Shaftsbury. (Furnace Brook is not a water supply).

Bolles Brook	A	7/1/71 ¹	5.3 miles
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Village of Bennington water supply. That portion of Bolles Brook and all waters within its watershed in the Towns of Glastenbury and Woodford upstream of the Bennington water intake.

Sucker Pond (Lake Hancock) & tributaries	A	12/23/52	70 acres
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Village of Bennington water supply. Lake surface and all waters within its watershed in Stamford.

¹ The Water Resources Board did not classify these waters. They are included as a result of the 1949 and 7/1/71 legislation which defined what constituted Class A waters.

Barney Brook A 7/1/71¹ 1.3 miles

Village of Bennington water supply. That portion of Barney Brook and all waters within its watershed in the Town of Woodford upstream of the water intake.

Unnamed tribuarty to South Stream A 7/1/71¹ 1.0 mile

Village of Bennington water supply. That a portion tributary to South Stream and all waters within its watershed in the Town of Woodford upstream of the water intake in Bennington.

C. Hoosic River

Roaring Branch A 7/1/71¹ 2.3 miles

Town of Bennington Water supply. That portion of Roaring Branch and all waters within its watershed in the Town of Stamford upstream of the water intake in Pownal.

Unnamed tributaries A 3/6/59 2.9 miles

Village of Pownal water supply. That portion of unnamed tributaries and their watersheds on Mann Hill in the Town of Pownal upstream of the water intake in Oak Hill Cemetery.

Unnamed tributaries. (Reservoir Hollow Brook and Ladd Brook)² A 3/6/59 (a) 0.8 miles (b) 1.5 miles

Village of North Pownal water supply. (a) Reservoir Hollow Brook and reservoir and all waters within its watershed. (Reservoir is approx. 0.5 mile upstream of the Hoosic River).

Village of Pownal water supply (b) Ladd Brook and all waters within its watershed in the Town of Pownal.

D. Entire Basin

All waters located above 2,500 feet altitude, National Geodetic Vertical Datum. A 5/17/86 No record

Section 4-02. Classification of the Poultney-Mettawee Basin (Basin 2)

All waters within this basin are Class B except as provided for below:

²Previously described as "unnamed tributaries" in the 3/6/59 classification proceedings.

Rutland City Reservoir	A	Legis. ¹	No Record
City of Rutland water supply. Rutland City Reservoir in Rutland Town and all waters within its watershed in Rutland Town and Mendon.			
Moon Brook	A	Legis. ¹	2.0 miles
Rutland-Mendon F.D. #2 water system (Gleason Road System - now abandoned). Moon Brook and all waters within its watershed in Mendon upstream of and including a small intake impoundment.			
Unnamed Tributary to Tenney Brook	A	Legis. ¹	1.1 miles
Rutland F.D. #2 (Gleason Road) water system. Unnamed tributary to Tenney Brook and all waters within its watershed in Mendon upstream of the water intake.			
Young's Brook	A	2/17/61	2.0 miles
Village of West Rutland water supply (No longer used). Young's Brook and reservoir and all waters within its watershed in West Rutland and Ira upstream of the water intake.			
Furnace Brook and Kiln Brook	A	2/17/61	5.5 miles
Village of Proctor water supply (Kiln Brook is the main source, with Furnace Brook used as a backup). Furnace Brook and Kiln Brook and all waters within their watersheds in Chittenden upstream of their confluence.			
Sugar Hollow Brook	A	2/17/61	2.0 miles
Town of Brandon water supply (No longer used). Sugar Hollow Brook and all waters within its watershed in Goshen and Chittenden upstream of the water intake.			
Leicester Hollow Brook	A	2/17/61	2.0 miles
Town of Brandon Water Supply (No longer used). Leicester Hollow Brook and all waters within its watershed in Leicester upstream of the water intake.			
B. <u>Lower Otter Creek</u>			
Brandy Brook	A	11/13/61	1.0 miles
Now or former water supply for Breadloaf School. Brandy Brook and all waters within its watershed.			
Unnamed tributary to Beaver Meadow Brook	A	11/13/61	1.3 miles

Village of Bristol water supply. Unnamed tributary to Beaver Meadow Brook and all waters within its watershed upstream of the water intake in Lincoln.

Unnamed tributary to Lewis A 7/1/71¹ 2.0 miles
Creek

Village of Starksboro water supply (No longer used). Unnamed tributary to Lewis Creek and all waters within its watershed in Starksboro upstream of the water intake.

Two unnamed tributaries to A 7/1/71¹ 1.6 and
Little Otter Creek 1.4 miles

City of Vergennes water supply (Not used since 1973). Two unnamed tributaries to Little Otter Creek and all waters with-in their watersheds in Monkton and Bristol upstream of two water intakes.

Notch Brook A 11/13/61 2.0 miles

Village of Middlebury water supply (Reserved for emergency use). Notch Brook and all waters with-in its watershed upstream of the water intake in Bristol.

Roaring Brook A 7/1/71¹ 3.3 miles

Wallingford F.D. #1 water supply. Roaring Brook and all waters within its watershed upstream of the water intake.

C. Entire Basin

All waters located above A 5/17/86 No record
2,500 feet altitude, National
Geodetic Vertical Datum.

Section 4-04. Classification of the Southern Champlain Basin (Basin #4)

All waters within this basin at or below 2,500 feet altitude National Geodetic Vertical Datum are Class B. All waters within this basin above 2,500 feet altitude, National Geodetic Vertical Datum are Class A. No other waters are Class A.

Section 4-05. Classification of the Northern Champlain Basin (Basin #5)

All waters within this basin are Class B except as provided for below:

A. Lake Champlain Including Minor Tributaries

<u>Waters</u>	<u>Class</u>	<u>Date</u>	<u>Approx. Miles/Acres</u>
Milton Pond	A	3/21/68	20 acres Pond only
<u>Description</u>			

Village of Milton water supply (No longer used). Milton Pond and all waters within its watershed in Milton.

Indian Brook Reservoir (Reservoir)	A	3/21/68	95 acres only)
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Former Essex Town water supply (No longer used - sold to developer). Indian Brook Reservoir and all waters within its watershed in Essex Town.

Colchester Pond	A	3/21/68	93 acres Pond only
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Village of Colchester water supply (Not used since 1974, but reserved for emergency use). Colchester Pond and all waters within its watershed in the Town of Colchester.

B. St. Albans Bay

Mill River	A	6/28/54 ¹	62 acres (Reservoir only)
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City of St. Albans water supply. Two reservoirs which drain to the Mill River and all waters within their watersheds in the Towns of Fairfax, St. Albans, and Fairfield.

C. Entire Basin

All waters located above 2,500 feet altitude National Geodetic Vertical Datum.	A	5/17/86	No Record
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Section 4-06. Classification of the Missisquoi Basin (Basin 6)

All waters within this basin are Class B except as provided for below:

A. Missisquoi River

<u>Waters</u>	<u>Class</u>	<u>Date</u>	<u>Approx. Miles/Acres</u>
Mountain Brook	A	5/28/70	1.6 and 1.1 miles

Description

Village of North Troy water supply (Reserved for emergency use). Mountain Brook and a tributary and all waters within their watersheds upstream of two separate water intakes in Jay.

Coburn Brook Reservoir and tributaries	A	5/28/70	2.0 miles
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Village of North Troy water supply (Reserved for emergency use). Coburn Brook and Coburn Brook Reservoir in Westfield and all waters within their watersheds upstream of the water intake in Coburn Brook.

Unnamed tributary to Trout River	A	5/28/70	0.6 mile
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Village of East Berkshire water supply. Unnamed tributary to the Trout River in Enosburg and all waters within its watershed upstream of the water intake.

Hannah Clark Brook	A	5/28/70	4.0 miles
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Village of Montgomery Ctr. water supply (Reserved for emergency use). Hannah Clark Brook in Montgomery and all waters in its watershed upstream of the water intake.

Stanhope Brook	A	5/28/70	5.0 miles
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Village Richford water supply. Stanhope Brook in Richford and all waters in its watershed upstream of the water intake.

Trout Brook	A	5/28/70	2.0 miles
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Village of Enosburg Falls water supply. (Reserved for emergency use). Trout Brook in Berkshire and all waters within its watershed upstream of the outlet of Enosburg Reservoir.

Loveland Brook	A	7/1/71 ¹	2.0 miles
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Village of Richford water supply. Loveland Brook in Richford and all waters within its watershed upstream of the water intake.

Black Falls Brook	A	7/1/71 ¹	5.0 miles
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Village of Montgomery Ctr. (Reserved for emergency use). Black Falls Brook in Montgomery and Richford and all waters within its watershed upstream of the water intake.

B. Entire Basin

All waters located above 2,500 feet altitude, National Geodetic Vertical Datum.	A	5/17/86	No Record
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Section 4-07. Classification of the Lamoille Basin (Basin 7)

All waters within this basin are Class B except as provided for below:

A. Lamoille River

Approx.

<u>Waters</u>	<u>Class</u>	<u>Date</u>	<u>Miles/Acres</u>
Smith Brook	A	7/1/71 ¹	1.6 miles

Description

Village of Johnson water supply. Smith Brook in Johnson and all waters in its watershed upstream of the water intake.

French Hill Brook	A	7/1/71 ¹	2.4 miles
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Village of Johnson water supply. French Hill Brook in Johnson and all waters in its watershed upstream of the water intake.

Silver Lake	A	2/13/70 ¹	30 acres (lake only)
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City of St. Albans water supply. Silver Lake and all waters in its watershed in the Towns of Georgia and Fairfax.

Unnamed Tributary to the Lamoille River	A	7/1/71 ¹	1.0 mile
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Village of Hardwick water supply (No longer used). Unnamed tributary to the Lamoille River and all waters in its watershed in Hardwick upstream of the water intake.

Unnamed Tributary to the Lamoille River	A	7/1/71 ¹	0.1 mile
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Village of Fairfax water supply (No longer used). Unnamed tributary to the Lamoille River and all waters in its watershed in Fairfax upstream of the water intake.

B. Entire Basin

All waters located above 2,500 feet altitude, National Geodetic Vertical Datum.	A	5/27/86	No record
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Section 4-08. Classification of the Winooski Basin (Basin 8)

All waters within this basin are Class B except as provided for below:

A. Lower Winooski River

<u>Waters</u>	<u>Class</u>	<u>Date</u>	<u>Approx. miles/acres</u>
Unnamed tributary to the the Winooski River	A	6/9/69 ¹	0.5 mile

Description

Not a water supply. Unnamed tributary to the Winooski River and all waters within its watershed. The mouth of the tributary is located approx. ½ mile downstream of the confluence of Alder Brook & the Winooski River.

Unnamed tributary to Alder Brook A 6/6/69¹ 0.4 mile

Former water supply for Winooski, Essex Center, Essex Jct. & Pinewood Manor (No longer used). Unnamed tributary and all waters within its watershed in Essex.

B. Middle Winooski River

Unnamed tributaries to Brook. Formerly "Thatcher Brk & tribs" A 5/14/63 2.5 miles

Village of Waterbury water supply. Unnamed tributaries to Thatcher Brook (Known locally to Tyler & Miriam Brooks).

Unnamed tributary to the West Branch of the Little River A 7/1/71¹ 1.3 miles

Village of Stowe water supply (Reserved for emergency use). An unnamed tributary to the West Branch of the Little River and all waters within its watershed in Stowe to the water intake.

C. Stevens Branch

Martin Brook, Reservoir & Tributaries A 8/7/69 3.5 miles

City of Barre water supply (Reserved for emergency use). Martin Brook in Williamstown and all waters within its watershed, including unnamed tributaries, to the water intake.

Bolster Reservoir and tributaries A 8/7/62 2.0 acres (Res.) & 2.2 miles(tribs)

Old City of Barre water supply. (It has been disconnected). Bolster Reservoir in South Barre and all waters within its watershed including Bolster Reservoir Brook, Pecks Pond and unnamed tributaries.

Thurman W. Dix Reservoir Lower Reservoir & tributaries A 8/7/62 119 acres & 9.9 miles

City of Barre water supply. Thurman W. Dix Reservoir, Lower Reservoir and all waters within their watersheds in the Towns of Barre and Orange including Orange Brook, Nelson Brook, Nate Smith Brook and unnamed tributaries.

Unnamed brook & tributaries A 8/7/62 1.4 miles

Old Village of East Barre water supply. (Reserved for emergency use). Unnamed brook and tributaries in the Town of Barre and all waters within their watersheds to the water intake.

Little John & Milne quarries A 8/7/62 No Record

Emergency Barre Town District #1 water supply for Village of East Barre. (Milne Quarry no longer used). Little John Quarry in Barre Town (Located just south of East Barre Village, at approx. elev. 1380').

Standard & Consolidated A 8/7/62 No Record
Quarries

Barre Town District #3 water supply for Websterville. Barclay Quarry and Quarry Hole #6 in the Town of Barre are the actual quarries referred to. The Barclay Quarry is located at approx. elev. 1540'. Quarry Hole #6 is located at approx. elev. 1420'.

Capital Quarry A 8/7/62 No Record

Websterville emergency water supply. Location of quarry unknown.

Old Granite Quarry A 8/7/62 No Record

Town of Barre Fire District #4 water supply. Standard Quarry in the Town of Barre is the quarry referred to. It is located at approx. elev. 1530'.
Note: All quarry holes in the Websterville/Graniteville area should be considered as reservoirs. The primary sources are springs and wells. When the wells and springs are overflowing, they are piped to the Standard Quarry. When Standard is full, it goes to the Barclay Quarry, then to the Murphy & Saldi quarries, all by gravity.

Berlin Pond A 8/7/62 256 acres

City of Montpelier water supply. Berlin Pond upstream of the dam and all waters within its watershed in the Towns of Berlin, Northfield, and Williamstown. The dam is located 300' downstream of where Paine Turnpike crosses the pond.

D. Entire Basin

All waters located above A 5/17/86 No record
2,500 feet altitude, National
Geodetic Vertical Datum.

Section 4-09. Classification of the White Basin (Basin 9)

All waters within this basin are Class B except as provided for below:

A. White River

<u>Waters</u>	<u>Class</u>	<u>Date</u>	<u>Approx. Miles/Acres</u>
Farnsworth Brook	A	12/28/77	2.0 milles

Description

Village of East Braintree public water supply. Farnsworth Brook and all waters within its watershed in the Town of Braintree upstream of the water intake.

Lake Casper & Lake John	A	12/28/77	No Record
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Village of South Royalton and F.D. #1 water supply. Lake Casper and Lake John and all waters within their watersheds in the Town of Royalton.

B. Entire Basin

All waters located above 2,500 feet altitude, National Geodetic Vertical Datum.	A	5/17/86	No Record
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Section 4-10. Classification of the Ottauquechee-Black Basin (Basin 10)

All waters within this basin are Class B except as provided for below:

A. Ottauquechee River

<u>Waters</u>	<u>Class</u>	<u>Date</u>	<u>Approx. miles/acres</u>
Spring and unnamed tributary to the Ottauquechee River	A	11/16/67	0.3 mile

Description

Village of North Hartland water supply (Reserved for emergency use). A spring and unnamed tributary to the Ottauquechee River and all waters within its watershed upstream of the water intake. The spring and brook are located approx. 1 mile north-northwest of North Hartland Village.

Cox, Vandell and Carlton Hill Reservoirs	A	11/16/67	Approx. 2.5 miles (Stream only)
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Village of Woodstock water supply (Private. Reserved for emergency use. Carlton Hill no longer in the system). Cox, Vandell and Carlton Hill Reservoirs in the Town of Woodstock and all waters within their watersheds.

Grant Brook (Off Jewell Brook)	A	3/30/66	Approx. 3.2 miles
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Village of Ludlow water supply (No longer in use). Grant Brook and all waters within its watershed upstream of the flood control dam.

B. Black River

Springfield Reservoir A 3/30/66 1.8 miles
Brook

Village of Springfield water supply (Reserved for emergency use).
Springfield Reservoir Brook and tributaries and all waters in its
watershed upstream of Springfield Reservoir.

Springfield Reservoir and A 3/30/66 9.8 acres
tributaries

Village of Springfield water supply (Reserved for emergency use).
Springfield Reservoir and all waters within its watershed.

C. Entire Basin

All waters located above A 5/17/86 No Record
2,500 feet altitude, National
Geodetic Vertical Datum.

Section 4-11. Classification of the West-Williams-Saxton Basin (Basin 11)

All waters within this basin are Class B except as provided for
below:

A. West-Williams-Saxtons River

<u>Waters</u>	<u>Class</u>	<u>Date</u>	<u>Approx. Miles/Acres</u>
Sunset Lake & Stickney Brook	A	7/26/78	3.0 sq. mi.

Description

Town of Brattleboro water supply. Sunset Lake and Stickney Brook and all
waters in their watersheds above the water intake in the Towns of
Marlboro, Newfane, and Brattleboro. (Water intake is located at the so-
called third dam, a distance of approx. 2.5 miles from Sunset Lake).

Styles Brook A 7/26/78 1.0 sq.mi.

Stratton Corp. water supply (Reserved for emergency use). Styles Brook
and all waters in its watershed above the diversion to Styles Reservoir.

Chester Reservoir & the A 7/26/78 1.0 sq. mi.
outlet stream above the water
intake.

Village of Chester water supply (Reserved for emergency use). Chester
Reservoir, the outlet stream above the water intake and all waters within
their watersheds in the Town of Chester. The water intake is approx. 0.3
mile below the reservoir.

Village of Readsboro water supply. Howe Pond and all waters within its watershed. Howe Pond Brook and all waters within its watershed above the water intake, which is located approx. 1.1 miles downstream from Howe Pond. Both pond and brook are located in the Town of Readsboro.

B. Entire Basin

All waters located above A 5/17/86 No record
2,500 feet altitude, National
Geodetic Vertical Datum.

**Section 4-13. Classification of the Lower Connecticut Basin
(Basin 13)**

All waters within this basin are Class B except as provided for below:

A. Lower Connecticut River

<u>Waters</u>	<u>Class</u>	<u>Date</u>	<u>Approx. Miles/Acres</u>
Back Pond	A	3/21/68	2.0 acres

Description

Village of Bellows Falls water supply. Back Pond and all water within its watershed, which is diverted to Minards Pond. Back Pond is located .1 mile north-west of Minards Pond in the Town of Rockingham.

Ellis Brook	A	7/1/71 ¹	246 acres (watershed)
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Village of Bellows Falls water supply. Ellis Brook and all waters in its watershed above the water intake, which is situated at elev. 715'MSL in the Town of Rockingham.

Farr Brook	A	7/1/71 ¹	154 acres (watershed)
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Village of Bellows Falls water supply. Farr Brook and all waters in its watershed above the water intake, which is located at elev. 710'MSL in the Town of Rockingham.

Minards Pond	A	7/1/71 ¹	46 acres
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Village of Bellows Falls water supply. Minards Pond and all waters in its watershed in the Town of Rockingham.

Unnamed tributary to Mill Brook	A	7/1/71 ¹	1.7 miles
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Village of Ascutney water supply. (Reserved for emergency use). Unnamed tributary to Mill Brook and all waters in its watershed above the water intake. The unnamed tributary is the first tributary to Mill Brook in the Town of Weathersfield.

Pleasant Valley Reservoir	A	3/21/68 ¹	25 acres
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Village of Brattleboro water supply. Pleasant Valley Reservoir and all waters in its watershed in the Town of Brattleboro. (Also refer to the classification of Sunset Lake & Stickney Brook - Basin #11)

Mill Brook	A	3/21/68 ¹	Approx. 3 miles
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Kurn Hattin School water supply. (Reserved for emergency use). Mill Brook and all water within its watershed above the water intake in the Town of Westminster. The intake is located approx. 1.0 mile upstream of its confluence with the Connecticut River.

Wright, Upper Hurricane & Lower Hurricane Reservoir	A	7/1/71 ¹	10.4 acres
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Hartford Town water supply. Wright, Upper Hurricane and Lower Hurricane Reservoirs and all waters within their watersheds in the Town of Hartford.

B. Entire Basin

All waters located above 2,500 feet altitude, National Geodetic Vertical Datum.	A	5/17/86	No record
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Section 4-14. Classification of the Stevens-Wells-Waits-Ompompanoosuc Basin (Basin 14)

All waters within this basin are Class B except as provided for below:

A. Waits River

<u>Waters</u>	<u>Class</u>	<u>Date</u>	<u>Approx. Miles/Acres</u>
Mill Pond Brook	A	2/19/60	3.0 miles

Description

Village of Bradford water supply (Reserved for emergency use). Mill Pond Brook and all waters within its watershed above the intake dam in the Towns of Fairlee, Bradford and West Fairlee.

Artificial impoundment on South Peacham Hollow Brook	A	4/28/76 ¹	No record
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Peach Fire District #1 water supply (The intake has been removed, and the town has gone to wells. No record of system anymore). An artificial

impoundment on South Peacham Hollow Brook, and all waters within its watershed above the intake. The impoundment is located approx. 1/2 mile east of Fosters Road in the Town of Peacham.

B. Entire Basin

All waters located above 2,500 feet altitude, National Geodetic Vertical Datum. A 5/17/86 No record

Section 4-15. Classification of the Passumpsic Basin (Basin 15)

All waters within this basin are Class B except as provided for below:

A. Passumpsic River

<u>Waters</u>	<u>Class</u>	<u>Date</u>	<u>Approx. miles/acres</u>
Unnamed tributary to Miller Run including Mathewson Reservoir	A	4/28/76 ¹	Approx. 1.5 miles

Description

Village of Lyndonville water supply (Reserved for emergency use). Unnamed tributary to Miller Run including Mathewson Reservoir and all waters within their watersheds above the intake in the Towns of Lyndon and Sutton.

Unnamed tributary to Miller Run including Copeland Reservoir	A	4/28/76 ¹	Approx. 1.5 miles
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Village of Lyndonville water supply (Reserved for emergency use). Unnamed tributary to Miller Run including Copeland Reservoir and all waters within their watersheds above the intake in the Towns of Lyndon and Sutton.

Two unnamed tributaries to Sutton River	A	4/28/76 ¹	0.8 mile
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Unknown water supply. Two unnamed tributaries to the Sutton River, near W. Burke, and all waters within their watersheds above the Murray water system intakes.

Chandler Pond	A	4/28/76 ¹	59 acres
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Lyndonville Village water supply (Reserved for emergency use). Chandler Pond and all waters within its watershed in the Town of Wheelock. Wheelock Pond drains to the South Wheelock Branch.

Woodworth Reservoir	A	4/28/76 ¹	No Record
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Lyndonville water supply (Reserved for emergency use) Woodworth Reservoir and all waters within its watershed in the Town of Lyndon. Woodworth Reservoir flows to the South Wheelock Branch.

Stiles Pond	A	4/28/76 ¹	5.5 miles 146 acres (Stiles Pond)
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St. Johnsbury Village water supply. Stiles Pond and all waters within its watershed in the Town of Waterford. Stiles Pond is in the St. Johnsbury municipal forest and flows to the Moose River.

Danville Reservoir	A	4/28/76 ¹	2.0 miles
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Danville Fire District No. 1 water supply. Danville Reservoir on tributary of Brown Brook and all waters within its watershed in Danville.

B. Entire Basin

All waters located above 2,500 feet altitude, National Geodetic Vertical Datum.	A	5/17/86	No record
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Section 4-16. Classification of the Northern Connecticut Basin (Basin 16)

All waters within this basin are Class B except as provided for below:

A. Upper Connecticut River

<u>Waters</u>	<u>Class</u>	<u>Date</u>	<u>Approx. Miles/Acres</u>
Charles Brown Brook	A	7/1/71 ¹	2.5 miles

Description

Village of Norwich water supply (Reserved for emergency use). Charles Brown Brook and all waters within its watershed above the water intake in the Town of Norwich.

Unnamed tributary to Connecticut River	A	7/1/71 ¹	1.0 mile
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Village of Newbury water supply. An unnamed tributary to the Connecticut River and all waters within its watershed above the water intake in the Town of Newbury. The tributary is approx. one mile south of Pulaski Mt. The intake is located approx. 0.7 mile upstream of its confluence with the Connecticut River.

Unnamed tributary to Connecticut River	A	7/1/71 ¹	0.2 mile
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Village of Bloomfield water supply. An unnamed tributary to the Connecticut River and all waters within its watershed above the water intake in the Town of Bloomfield. The intake is approx. 0.5 mile above "Basin Hole."

Unnamed tributary to Lake A 7/1/71¹ 1.1 miles
Morey

Village of Fairlee water supply (Reserved for emergency use). An unnamed tributary to Lake Morey and all waters in its watershed in the Town of Fairlee to the water intake dam, including a man-made impoundment.

B. Entire Basin

All waters located above A 5/17/86 No record
2,500 feet altitude, National
Geodetic Vertical Datum.

Section 4-17. Classification of the Memphremagog Basin (Basin 17)

All waters within this basin are Class B except as provided for below:

A. Lake Memphremagog and International Stream

<u>Waters</u>	<u>Class</u>	<u>Date</u>	<u>Approx. miles/acres</u>
Unnamed reservoir near Derby Line	A	7/1/71 ¹	No record

Description

Derby Line water supply. An unnamed reservoir and all waters in its watershed in the Town of Derby.

May Pond Brook and May Pond A 10/30/87 13 acres

Village of Barton water supply. May Pond Brook and all waters within its watershed in the Town of Barton above and including the water supply reservoir and May Pond. The reservoir is located approximately 3/4 mile upstream of the brook's confluence with Crystal Lake.

B. Black-Barton-Clyde Rivers

Unnamed tributary to the A 2/20/75¹ 1.0 mile
Black River

Coventry Fire District #1 water supply (Reserved for emergency use.) An unnamed tributary to the Black River and all waters within its watershed above the water intake in the Town of Coventry.

Unnamed tributary to Island A 2/20/75 1.0 mile
Pond

Town of Brighton water supply. An unnamed tributary to Island Pond and all waters within its watershed in the Town of Brighton above the water intake at approx. elev. of 1544.0'MSL. The tributary flows northerly to Island Pond.

Unnamed tributary to A 2/20/75 2.0 miles
Lightning Brook

Town of Brighton water supply. Two unnamed tributaries to an unnamed tributary to Lightning Brook and all waters in their watersheds in the Town of Brighton above the intakes. The main intake is at approx. elevation 1526.0'MSL, and the upper, more northerly intake is diverted to the main intake.

C. Entire Basin

All waters located above A 5/17/86 No record
2,500 feet altitude, National
Geodetic Vertical Datum.

APPENDIX A
Fish Habitat Designation

A. Warm Water Fish Habitat

All wetlands, except those designated as cold water fish habitat in paragraph B below, and the following waters are designated as warm water fish habitat for purposes of these rules:

1. Battenkill, Walloomsac, Hoosic Basin
 - (a) Lake Hancock (Sucker Pond), Stamford
 - (b) Thompsons Pond, Pownal
2. Poultney, Mettawee Basin
 - (a) All waters west of Vermont Route 22A.
 - (b) Austin Pond, Hubbardton
 - (c) Beebe Pond, Hubbardton
 - (d) Billings Marsh Pond, West Haven
 - (e) Burr Pond, Sudbury
 - (f) Coggman Pond, West Haven
 - (g) Echo Lake (Keeler Pond) Hubbardton/Sudbury
 - (h) Half Moon Pond, Hubbardton
 - (i) Hinkum Pond, Sudbury
 - (j) Lake Hortonia, Hubbardton/Sudbury
 - (k) Inman Pond, Fair Haven
 - (l) Lily Pond, Poultney
 - (m) Little Pond, Wells
 - (n) Love's Marsh, Castleton
 - (o) Mill Pond (Parson's Mill Pond), Benson
 - (p) Northeast Developer's Pond, Wells
 - (q) Old Marsh Pond, Fair Haven
 - (r) Pine Pond, Castleton
 - (s) Poultney River from Carvers Falls in West Haven to its confluence with Lake Champlain
 - (t) Sunrise Lake, Benson/Orwell
3. Otter Creek, Little Otter Creek and Lewis Creek Basin
 - (a) All waters lying west of Vermont Route 22A and south of the City of Vergennes.
 - (b) Brilyea East Pond, Addison
 - (c) Brilyea West Pond, Addison
 - (d) Chipman Lake (Tinmouth Pond), Tinmouth
 - (e) Danby Pond, Danby
 - (f) East Creek Site I, Orwell
 - (g) Fern Lake, Leicester
 - (h) Lemon Fair River
 - (i) Mud Pond, Leicester
 - (j) Otter Creek from the outfall of the Proctor wastewater treatment facility in Proctor, to its confluence with Lake Champlain, except that portion between the Beldens Dam and the Huntington Falls Dam in New Haven/Weybridge.
 - (k) Richville Pond, Shoreham
 - (l) Stone Bridge Pond, Panton/Addison
 - (m) Wallingford Pond, Wallingford
4. Lower Lake Champlain Basin
 - (a) Lake Champlain south of the Crown Point Bridge.

(b) Lake Champlain, between the Crown Point Bridge and the Ferrisburg-Charlotte town boundary, where depths are less than 25 feet at Low Lake Level (93 feet NGVD) - June 1, through September 30, only.

(c) Perch Pond, Benson

5. Upper Lake Champlain Basin

(a) All streams, creeks and brooks lying with Grand Isle County.

(b) Lake Carmi, Franklin(c)
Lake Champlain, between the Ferrisberg-Charlotte town boundary and the Canadian boundary, where depths are less than 25 feet at Low Lake Level (93 feet NGVD) - June 1, through September 30, only.

(d) Cutler Pond, Highgate

(e) Holmes Creek, Charlotte,

(f) Indian Brook, Colchester from Vermont Routes 2 & 7 to its confluence with Lake Champlain

(g) Lake Iroquios, Hinesburg/Williston

(h) Long Pond, Milton

(i) Lower Lake, (Lake Sunset), Hinesburg

(j) Malletts Creek, Colchester, from Vermont Routes 2 & 7 to its confluence with Lake Champlain

(k) Milton Pond, Milton

(l) Mud Creek Pond, Alburg

(m) Murr (Monroe) Brook, Shelburne

(n) Rock River from the Canadian boundary to its confluence with Lake Champlain

(o) Round Pond, Milton

(p) St. Albans Reservoir (N), Fairfax

(q) Stevens Brook, St. Albans

6. Missisquoi Basin

(a) Metcalf Pond, Fletcher

(b) Fairfield Pond, Fairfield

(c) Fairfield Swamp Pond, Fairfield

(d) Missisquoi River from the outfall of the Enosburg Falls wastewater treatment facility to the Swanton Dam Swanton

7. Lamoille Basin

(a) Arrowhead Mountain Lake, Milton/Georgia

(b) Flagg Pond, Wheelock

(c) Halfman Pond, Fletcher

(d) Hardwick Lake, Hardwick

(e) Horse Pond, Greensboro

(f) Lake Elmore, Elmore

(g) Lamoille River from the Peterson Dam in Milton to its confluence with Lake Champlain - June 1, through September 30, only.

(h) Long Pond (Belvidere Pond), Eden

(i) Long Pond, Greensboro

(j) Tuttle Pond, Hardwick

(k) Wapanaki Lake, Wolcott

8. Winooski Basin

(a) Berlin Pond, Berlin

(b) Bliss Pond, Calais

(c) Coits Pond, Cabot

- (d) Cranberry Meadow Pond, Woodbury
 - (e) Curtis Pond, Calais
 - (f) Gillett Pond, Richmond
 - (g) Harwood Pond, Elmore
 - (h) Molly's Pond, Cabot
 - (i) North Montpelier Pond, East Montpelier/Calais
 - (j) Richmond Pond, Richmond
 - (k) Shelburne Pond, Shelburne
 - (l) Sodom Pond, East Montpelier/Calais
 - (m) Valley Lake (Dog Pond), Woodbury
 - (n) Winooski River from Green Mountain Power Corporation #19, in Essex/Williston to its confluence with Lake Champlain - June 1, through September 30, only.
9. White River Basin
- (a) Lamson Pond, Brookfield
 - (b) Silver Lake, Barnard
10. Ottauquechee, Black Basin
- (a) Black River from the Lovejoy Dam in Springfield to its confluence with the Connecticut River - June 1, through September 30, only.
 - (b) Deweys Mill Pond, Hartford
 - (c) Lake Ninevah, Mount Holly
 - (d) Lake Pinneo, Hartford
 - (e) North Hartland Reservoir, Hartland/Hartford
 - (f) North Springfield Reservoir, Springfield/Weathersfield
 - (g) Ottauquechee River from the North Hartland Dam in Hartland to its confluence with the Connecticut River.
11. West, Williams, and Saxtons Basin
- (a) Burbee Pond, Windham
 - (b) Cole Pond, Jamaica
 - (c) Lily Pond, Londonderry
 - (d) Lowell Lake, Londonderry
12. Deerfield Basin
- (a) Gates Pond, Whitingham
 - (b) Grout Pond, Stratton
 - (c) Howe Pond, Readsboro
 - (d) Jacksonville Pond, Whitingham
 - (e) North Pond, Whitingham
 - (f) Sadawaga Pond, Whitingham
 - (g) Shippee Pond, Whitingham
13. Lower Connecticut, Mill Brook Basin
- (a) Lake Runnemedede (Evert's Pond), Windsor
 - (b) Lily Pond, Vernon
 - (c) Mindards Pond, Rockingham
14. Stevens, Wells, Waits, Ompompanoosuc Basin
- (a) Lake Abenaki, Thetford
 - (b) Ticklenaked Pond, Ryegate
 - (c) Waits River from the CVPS Dam in Bradford to its confluence with the Connecticut River - June 1, to September 30.
15. Passumpsic Basin
- (a) Bruce Pond, Sheffield
 - (b) Chandler, Wheelock
 - (c) Keiser Pond, Peacham/Danville

16. Upper Connecticut, Nulhegan, Willard Stream, Paul Stream Basin

- (a) Dennis Pond, Brunswick
- (b) Halls Lake, Newbury
- (c) Harriman Pond, Newbury
- (d) Lake Morey, Fairlee
- (e) Lower Symes Pond, Ryegate
- (f) Stevens Pond, Maidstone

17. Lake Memphremagog, Black, Barton, Clyde, Coaticook, Basin

- (a) Daniels Pond, Glover
- (b) Lake Derby, Derby
- (c) Long Pond, Sheffield
- (d) Little Hosmer Pond, Craftsbury
- (e) Mud Pond, Craftsbury
- (f) Mud Pond, (North) Morgan
- (g) Tildy's Pond (Clark Pond), Glover
- (h) Toad Pond, Charleston
- (i) Turtle Pond, Holland

B. Cold Water Fish Habitat

1. All waters not designated as warm water fish habitat by subsection A are hereby designated as cold water fish habitat for purposes of these rules.

2. The following wetlands are designated as cold water fish habitat:

- (a) Those wetlands adjacent to the Dog River and its tributaries from the headwaters of the Dog River to the point where it first crosses State Aid highway #62 in Roxbury, a distance of approximately 1.5 miles.
- (b) Those wetlands adjacent to the headwaters of the Winhall River and its tributaries on the east and west side from the outlet of Stratton Pond to the Stratton-Winhall boundary, a distance of approximately 2.0 miles.
- (c) Those wetlands adjacent to the Batten Kill River from a point .75 miles north of East Dorset and extending to its confluence with Dufresne Pond in Manchester, a distance of approximately 5.5 miles.
- (d) Those wetlands adjacent to the New Haven River and its tributaries from its confluence with Blue Bank Brook in Lincoln upstream to the headwaters of the respective tributaries, a distance of approximately 1.75 miles.

Appendix B - Phosphorus Criteria (§ 3-01(B)(3)(c))
Description of Lake Champlain and Lake Memphremagog segments.

<u>Segment</u>	<u>Description</u>
Lake Champlain Missisquoi Bay	Area north of East Alburg (Route 78) bridge and south of the international border.
Isle La Motte	Area within Vermont waters west of Grand Isle and North Hero Islands, and north of a line from Cumberland Head, NY to Wilcox Point on Grand Isle.
St. Albans Bay	Area northeast of a line from Hathaway Point to Lime Rock Point.
Northeast Arm	Area within Vermont Waters east of Grand Isle and North Hero Islands, and north of the Sandbar Bridge, excluding St. Albans Bay, and including the large bays on Grand Isle and North Hero.
Malletts Bay	Area south of Sandbar Bridge and east of the causeway from Colchester Point to Grand Isle.
Main Lake	Area within Vermont waters south of a line from Cumberland Head, NY to Wilcox Point on Grand Isle, and north of a line from Split Rock Point, NY to Thompsons Point, VT, excluding Malletts Bay, Burlington Bay and Shelburne Bay.
Burlington Bay	Area east of a line from Lone Rock Point to Oakledge.
Shelburne Bay	Area south of a line from Shelburne Point to Red Rock Point.
Otter Creek	Area within Vermont waters south of a line from Split Rock Point, NY to Thompsons Point, VT, and north of a line

Port Henry	from Rock Harbor, NY to Basin Harbor, VT. Area within Vermont waters south of a line from Rock Harbor, NY to Basin Harbor, VT, and north of Crown Point Bridge.
South Lake A	Area within Vermont waters south of Crown Point Bridge and north Benson Landing.
South Lake B	Area within Vermont waters south of Benson Landing.
Lake Memphremagog	
Main Lake	Area within Vermont waters north of the Route 5 Bridge.
South Bay	Area south of the Route 5 bridge and north of the mouth of the Barton River.

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Appendix C: Water Quality Criteria for the Protection of Human Health

Compound	CAS Number	Carcinogenic	For Consumption of:	
			water & organisms (ug/l unless indicated otherwise)	organisms only (ug/l unless indicated otherwise)
Acrolein	107028	No	320	780
Acrylonitrile	107131	Yes	0.059	0.66
Aldrin	309002	Yes	0.00013	0.00014
Antimony	7440360	No	14	4,300
Arsenic	7440382	Yes	0.02	1.5
Asbestos	1332214	Yes	70x10 ⁵ f/l	-
Benzene	71432	Yes	1.2	71
Benzidine	92875	Yes	0.00012	0.00054
Carbon Tetrachloride	56235	Yes	0.25	4.4
Chlordane	57749	Yes	0.00057	0.00059
Chloroethyl ether (Bis-2)	111444	Yes	0.031	1.4
Chloroisopropyl ether (Bis-2)	108601	Yes	1,400	170,000
Chloroform	67663	Yes	5.7	470
Cyanide	57125	No	700	220,000
4,4'-DDT	50293	Yes	0.00059	0.00059
4,4'-DDE	72559	Yes	0.00059	0.00059
4,4'-DDD	72548	Yes	0.00083	0.00084
Di-n-butyl Phthalate	84742	No	2,700	12,000
1,2-Dichlorobenzene	95501	No	2700	17,000
1,3-Dichlorobenzene	541731	No	400	2,600

Appendix C: Water Quality Criteria for the Protection of Human Health

Compound	CAS Number	Carcinogenic	For Consumption of:	
			water & organisms (ug/l unless indicated otherwise)	organisms only (ug/l unless indicated otherwise)
1,4-Dichlorobenzene	106467	No	400	2,600
3,3'-Dichlorobenzidine	91941	Yes	0.04	0.077
1,2-Dichloroethane	107062	Yes	0.38	99
1,1-Dichloroethylene	75354	Yes	0.057	3.2
2,4-Dichlorophenol	120832	No	93	790
1,3-Dichloropropylene	542756	No	10	1700
Dieldrin	60571	Yes	0.00014	0.00014
Diethyl Phthalate	84662	No	23,000	120,000
Bis(2-Ethylhexyl)Phthalate	117817	Yes	1.8	5.9
Dimethyl Phthalate	131113	No	313,000	2,900,000
2,4 Dinitrophenol	51285	Yes	70	14000
2-Methyl-4,6-Dinitrophenol	534521	No	13.4	765
2,4-Dinitrotoluene	121142	Yes	0.11	9.10
Dioxin (2,3,7,8-TCDD)	1746016	Yes	0.13x10 ⁻⁷	0.14x10 ⁻⁷
1,2-Diphenylhydrazine	122667	No	0.040	0.54
alpha-Endosulfan	959988	No	0.93	2.0
beta-Endosulfan	33213659	No	0.93	2.0
Endosulfan Sulfate	1031078	No	0.93	2.0
Endrin	72208	No	0.76	0.81
Endrin Aldehyde	7421934	No	0.76	0.81

Appendix C: Water Quality Criteria for the Protection of Human Health

Compound	CAS Number	Carcinogenic	For Consumption of:	
			water & organisms (ug/l unless indicated otherwise)	organisms only (ug/l unless indicated otherwise)
Ethylbenzene	100414	No	3100	29,000
Bromoform	75252	Yes	4.3	360
Chlorodibromomethane	124481	Yes	0.41	34
Dichlorobromomethane	75274	Yes	0.27	22
Methyl Bromide	74839	No	48	4000
Methylene Chloride	75092	Yes	4.7	1600
Heptachlor	76448	Yes	0.00021	0.00021
Heptachlor Epoxide	1024573	Yes	0.00010	0.00011
Hexachlorobenzene	118741	Yes	0.00075	0.00077
Hexachlorobutadiene	87683	Yes	0.44	50
Hexachlorocyclohexane-Alpha	319846	Yes	0.0039	0.013
Hexachlorocyclohexane-Beta	319857	Yes	0.014	0.046
Hexachlorocyclohexane-Gamma (Lindane)	58899	Yes	0.019	0.063
Hexachlorocyclopentadiene	77474	No	240	17000
Hexachloroethane	67721	Yes	1.9	8.9
Isophorone	78591	No	8.4	600
Mercury	7439976	No	0.14	0.15
Monochlorobenzene	108907	No	680	21,000
Nickel	7440020	No	610	4600

Appendix C: Water Quality Criteria for the Protection of Human Health

Compound	CAS Number	Carcinogenic	For Consumption of:	
			water & organisms (ug/l unless indicated otherwise)	organisms only (ug/l unless indicated otherwise)
Nitrobenzene	98953	No	17	1,900
N-Nitrosodimethylamine	62759	Yes	0.00069	8.1
N-Nitrosodiphenylamine	86306	Yes	5.0	16
Pentachlorophenol	87865	Yes	0.28	8.2
Phenol	108952	No	21,000	4.6x10 ⁶
PCB-1242	53469219	Yes	0.000044	0.000045
PCB-1254	11097691	Yes	0.000044	0.000045
PCB-1221	11104282	Yes	0.000044	0.000045
PCB-1232	11141165	Yes	0.000044	0.000045
PCB-1248	12672296	Yes	0.000044	0.000045
PCB-1260	11096825	Yes	0.000044	0.000045
PCB-1016	12674112	Yes	0.000044	0.000045
Anthracene	120127	No	9600	110,000
Benzo(a)Anthracene	56553	Yes	0.0028	0.031
Benzo(a)Pyrene	50328	Yes	0.0028	0.031
Benzo(b)Fluoranthene	205992	Yes	0.0028	0.031
Benzo(k)Fluoranthene	207089	Yes	0.0028	0.031
Chrysene	218019	Yes	0.0028	0.031
Dibenzo(a,h)Anthracene	53703	Yes	0.0028	0.031
Fluorene	86737	No	1300	14,000

Appendix C: Water Quality Criteria for the Protection of Human Health

Compound	CAS Number	Carcinogenic	For Consumption of:	
			water & organisms (ug/l unless indicated otherwise)	organisms only (ug/l unless indicated otherwise)
Indeno(1,2,3-cd)Pyrene	193395	Yes	0.0028	0.031
Pyrene	129000	No	960	11,000
Fluoranthene	206440	No	300	370
1,1,2,2-Tetrachloroethane	79345	Yes	0.17	11
Tetrachloroethylene	127184	Yes	0.8	8.85
Thallium	7440280	No	1.7	6.3
Toluene	108883	No	6,800	200,000
Toxaphene	8001352	Yes	0.00073	0.00075
1,1,2-Trichloroethane	79005	Yes	0.60	42
Trichloroethylene	79016	Yes	2.7	81
2,4,6-Trichlorophenol	88062	Yes	2.1	6.5
Vinyl Chloride	75014	Yes	2	525

Criteria are in micrograms/liter (parts per billion) unless otherwise noted; f = fibers/liter

Carcinogenic - for those toxic substances which are identified as carcinogens the criteria have been established at a risk level of 10^{-6} assuming a lifetime exposure to a 70 Kg male consuming 6.5 grams per day of fish and shell-fish products and ingesting 2.0 liters of water per day.

-for those toxic substances which are identified as noncarcinogens the criteria are best estimates of concentrations which are not expected to produce adverse effects in human health assuming a lifetime exposure to a 70 Kg male consuming 6.5 grams per day of fish and shell-fish products and ingesting 2.0 liters of water per day.

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Appendix D: Water Quality Criteria for the Protection of Aquatic Organisms

Compound	CAS Number	Maximum Allowable Concentration Acute Criteria ($\mu\text{g/l}$) ^a	Average Allowable Concentration Chronic Criteria ($\mu\text{g/l}$) ^a
Aldrin ^b	309002	3.0	-----
Ammonia ^c	NA	see EPA water quality criteria document for Ammonia	
Arsenic ^d	7440382	360	190
Cadmium ^{d,e}	7440439	$\exp(1.128(\ln \text{ hardness}) - 3.828)$	$\exp(0.7852(\ln \text{ hardness}) - 3.490)$
Chlordane ^b	57749	2.4	.0043
Chlorine ^c	7782505	19	11
Chlorpyrifos ^c	2921882	0.083	0.041
Chromium (VI) ^d	18540299	16	11
Chromium (III) ^{d,e}	16065831	$\exp(0.8190(\ln \text{ hardness}) + 3.688)$	$\exp(0.8190(\ln \text{ hardness}) + 1.561)$
Copper ^{d,e}	7440508	$\exp(0.9422(\ln \text{ hardness}) - 1.464)$	$\exp(0.8545(\ln \text{ hardness}) - 1.465)$
Cyanide	57125	22	5.2
DDT ^b	50293	1.1	0.001
Demeton ^c	8065483	-----	0.1
Dieldrin ^b	60571	2.5	0.0019
alpha-Endosulfan ^b	959988	0.22	0.056
beta-Endosulfan ^b	33213659	0.22	0.056
Endrin ^b	72208	0.18	0.0023
Heptachlor ^b	76448	0.52	0.0038
Heptachlor Epoxide ^b	1024573	0.52	0.0038
Hexachlorocyclohexane (Lindane)	58899	2.0	0.8
Iron ^c	NA	-----	1,000
Lead ^{d,e}	7439921	$\exp(1.273(\ln \text{ hardness}) - 1.460)$	$\exp(1.273(\ln \text{ hardness}) - 4.705)$
Malathion ^c	121755	-----	0.1
Mercury ^{d,f}	7439976	2.4	0.012

Appendix D: Water Quality Criteria for the Protection of Aquatic Organisms

Compound	CAS Number	Maximum Allowable Concentration Acute Criteria ($\mu\text{g/l}$) ^a	Average Allowable Concentration Chronic Criteria ($\mu\text{g/l}$) ^a
Nickel ^{d, e}	7440020	$\exp(0.8460(\ln \text{hardness}) + 3.3610)$	$\exp(0.8460(\ln \text{hardness}) + 1.1645)$
Parathion ^c	56382	0.065	0.013
Pentachlorophenol	87865	$\exp(1.005(\text{pH}) - 4.830)$	$\exp(1.005(\text{pH}) - 5.290)$
PCB-1242	53469219	-----	0.014
PCB-1254	11097691	-----	0.014
PCB-1221	11104282	-----	0.014
PCB-1232	11141165	-----	0.014
PCB-1248	12672296	-----	0.014
PCB-1260	11096825	-----	0.014
PCB-1016	12674112	-----	0.014
Selenium	7782492	20	5
Silver ^{d, e}	7440224	$\exp(1.72(\ln \text{hardness}) - 6.52)$	-----
Toxaphene	8001352	0.73	0.0002
Zinc ^{d, e}	7440666	$\exp(0.8473(\ln \text{hardness}) + 0.8604)$	$\exp(0.8473(\ln \text{hardness}) + 0.7614)$

^a Maximum Allowable Concentration (MAC) = the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1-hour average) without deleterious effects. Average Allowable Concentration (AAC) - the highest concentration of a pollutant to which aquatic life can be exposed for an extended period of time (4 days) without deleterious effects. $\mu\text{g/l}$ = micrograms per liter. The MAC is the equivalent to the Federal Criteria Maximum Concentration (CMC) and the AAC is equivalent to the Federal Criteria Continuous Concentration (CCC).

^b The aquatic life criteria for this compound we developed in 1980 using 1980 EPA guidelines for criteria development. the CMC or acute value shown is a final acute value (FAV) which by the 1980 guidelines is an instantaneous.

^c Compound is not listed in EPA's Section 304(a) Criteria for Priority Toxic Pollutants as published in the December 22, 1992, pages 60911-60917, of the Federal Register but is included in Appendix O of the Vermont Water Quality Standards because the pollutant can be deleterious to aquatic life and a criteria has been developed for the protection of aquatic organisms.

^d Criteria for this metal is expressed as a function of the water effect ratio, WER, as defined in 40 CFR 131-36(C).
 CMC = acute criterion ($\mu\text{g/l}$) x WER
 CCC = chronic criterion ($\mu\text{g/l}$) x WER

^e Aquatic life criteria for this metal is expressed as a function of total hardness ($\mu\text{g/l}$), and as a function of the pollutant's water effect ratio, WER, as defined in §131.36(c).

^f if the CCC for total mercury exceeds 0.012 $\mu\text{g/l}$ more than once in a three year period in the ambient water, the edible portion of aquatic species of concern must be analyzed to determine whether the concentration of methyl mercury exceeds the FDA action level of 1.0 mg/Kg. If the FDA action level is exceeded, the EPA Regional Administrator must be notified. A revision of the mercury criterion must be initiated in the States Water Quality Standards so as to protect designated uses, and take other appropriate action such as issuance of a fish consumption advisory for its affected area.

APPENDIX C

Draft Vermont Anti-Degradation Implementation Procedure

Vermont Agency of Natural Resources
Anti-Degradation Implementation Procedure - Including
Protection and Restoration of High Quality Waters

1. Background

Extensive efforts over the past three decades have improved the state's water quality for a new generation of Vermonters. The Federal Clean Water Act, largely funded this restoration. It requires each state to adopt policies and procedures which will prevent back-sliding to lower water quality conditions. These procedures are dedicated to a watchful stewardship over waters that have been restored, as well as to restoration of those waters which require improvement.

2. Purpose

These procedures implement the anti-degradation policy in the Vermont Water Quality Standards, Section 1-03 (effective 8-1-94). They are adopted pursuant to the federal Clean Water Act (40 CFR 131.12). The anti-degradation policy and this implementation procedure are intended to protect existing uses and existing water quality which is better than the minimum criteria of the standards; and to determine, where necessary, the degree of water quality improvement or degradation that is in the public interest. This procedure is for use with existing permits, where appropriate, to ensure the consistency of state regulatory actions with the Vermont Water Quality Standards.

3. Vermont Anti-Degradation Policy: Key Provisions

Key points of the anti-degradation policy (Vermont Water Quality Standards § 1-03) are stated below. Implementation is addressed in Sections 4 and 5.

1. The waters of the state shall be managed in accordance with the Water Quality Standards to protect, maintain, and improve water quality in such a manner that the beneficial values and uses associated with their classification are attained.
2. Existing and designated uses shall be identified, maintained and protected.
3. Limited water quality reduction of high quality waters may be allowed based on socio-economic need.
4. Exceptional values of Outstanding Resource Waters shall be protected.

4. Water Resources Planning

All parties who are involved in a permit process or who are active in the planning of new uses of public waters shall first determine existing¹ and designated² uses, the public interest in these uses, and the extent to which the uses are dependent on water quality. The Agency will encourage project sponsors and other interested persons to document existing and designated uses and water quality conditions including:

- Nature Aquatic habitat (chemical attributes and physical attributes including flow regime and morphometry)
Aquatic biota (vertebrates, invertebrates, and plant life)
Wetlands and their functions
Wildlife habitat (including shoreland vegetation and riparian uses)
Wildlife
Threatened, endangered, or rare species
Rare and irreplaceable natural areas;
- Recreation Swimming holes and bathing areas
Boatable flatwaters and boatable whitewaters
Scenic areas such as waterfalls and natural corridors
Public access (including formal fishing and boating access)
Angling use
Water resource aesthetics and character; and
- Culture Water supply
Commercial activity depending directly on water quality
Historical and archeological resources
Agricultural uses

Information on the above uses and values may be obtained from direct field observation and from sources³, which include but are not limited to:

- Designated uses and values described in 10 V.S.A. 47 Section 1252.
- Findings of the Water Resources Board in Outstanding Resource Waters, Class A Waters, and Class 1 Wetlands designations.
- State river plans, surface water plans, and shoreland use plans, including the

¹ **Existing uses** are those uses which have actually occurred on or after November 28, 1975, in or on a waterbody whether or not the uses are included in the standard for classification of the particular waterbody.

² **Designated uses** means any value or use, whether existing or not, that is specified in the management objectives of Class A and Class B waters.

³ The public is encouraged to participate in municipal and state forums whenever possible to improve the background information available to those involved in assessing or pre-planning a project that may affect Vermont water resources.

- DEC "Inventory of River, Lake, and Wetland Uses, Values, and Functions",
- Town, regional, and federal plans
 - Minutes of public meetings and hearings.

5. Implementation Procedures

The Secretary must determine whether the full restoration of high quality waters or a slight reduction in the quality of high quality waters is in the public interest.

In order to achieve the goals of this procedure, the Agency will use a three step procedure to evaluate new activities and substantial modifications to existing activities. The Secretary must find that the proposed project results in no more than minimal impairment to the physical and chemical water quality and habitat conditions, the biological community, and the aesthetic character of the receiving water. The consideration of alternatives under the three steps below includes environmental, social, and economic factors; and:

- pollution prevention and source reduction,
- improved operation and maintenance,
- improved levels of treatment, and
- alternative site locations.

(a). Step I Natural Conditions

A waterbody in its natural condition has physical, chemical, and biological qualities that occur in the absence of waste discharges and physical alterations. The Agency will seek alternatives that maintain or restore the chemical/physical water quality conditions necessary to maintain the natural biological community of the waterbody and its designated uses and values. The natural biological community and chemical/physical conditions shall be considered to be maintained or restored, if the Secretary finds:

1. The discharge or activity is to an Outstanding Resource Water designated by Vermont Water Resources Board because of its pristine physical/chemical water quality values (referred to in 10 V.S.A. Sec.1424a(d)(1)) and the natural conditions of the high quality waters are maintained or restored⁴;
2. **OR**, the physical, chemical, and biological qualities that exist under the natural conditions support existing or potential uses of the waterbody that have high social, economic, or environmental benefits to the people of the state;
3. **AND**, the natural conditions of high quality waters will be maintained or restored;

⁴

Where natural conditions occur, the recommended alternative will not change the physical, chemical, and biological conditions of the waterbody.

4. **AND**, the social and economic costs to the people of the state of the pollution control alternative chosen are not substantial, widespread, and prohibitive, and are offset by the benefits resulting from the maintenance or restoration of natural conditions.

(b). Step II Chemical/Physical Change

Certain discharges and alterations to a waterbody, wetland, or shoreland are so small in relation to the size of the waterbody, that the resulting impact on the aquatic biota of the waterbody and its designated uses and values may be considered negligible. Where the Secretary can not find that natural conditions are maintained or restored as required in Step I, and there is no feasible alternative that would maintain or restore the natural condition of the waterbody, the Agency will seek an alternative that results in a minimal change from the natural chemical/physical condition of the waterbody. A minimal change from the natural chemical/physical condition is one which will allow the waterbody to fully support its designated uses and values and will not significantly alter the aquatic biota. The natural biological community shall be maintained or restored with minimal change to chemical/physical conditions, if the Secretary finds:

1. The discharge or activity is in a Class A watershed, and
 - (a) results in the maintenance or restoration of the natural biological conditions of the waterbody⁵, and
 - (b) the discharge or activity is of limited duration and permitted according to the Vermont Water Quality Standards, Section 2-04B, or
 - (c) the discharge or activity consists of nonpolluting wastes, does not result in a violation of Class A standards and does not change background conditions for E. coli bacteria, color, and turbidity, or
 - (d) the discharge or activity consists of stormwater and does not result in a significant alteration of the aquatic biota. A significant alteration of the aquatic biota is defined in the Water Quality Standards, Section 1-03A.
2. **OR**, the minimal change to chemical/physical qualities of the waterbody caused by the discharge or activity results in no change to the natural biological conditions and the full support of the existing and potential uses that have social, economic, and environmental benefits to the people of the state.

⁵

Where high quality waters exist, the recommended alternative may result in a change to the chemical/physical qualities but will not result in a change to the biological qualities of the waterbody

This finding will include consideration of:

- cumulative impacts of multiple activities over the time period specified by the permit, including chemical influences and physical influences such as water level, flow, depth, velocity, hydro period, channel morphology, and embeddedness;
- the discharge of bioaccumulative and/or persistent substances;
- change in the assimilative capacity of the receiving waters;
- mass loading of pollutants, especially those that are persistent.

3. **AND**, the social and economic costs to the people of the state of the pollution control alternative chosen are not substantial, widespread, and prohibitive, and are offset by the benefits resulting from the maintenance or restoration of natural biological conditions.

(c). Step III Chemical/Physical and Biological Change

Where the Secretary can not find that natural conditions are maintained or restored as required in Steps I and II, and there is no feasible alternative that will restore natural biological conditions and avoid adverse effects on aquatic biota, existing uses or designated uses and values of the waterbody, the Agency will seek an alternative that results in the least amount of change from the natural chemical/physical and biological conditions of the waterbody. The selected alternative will not result in an undue adverse effect on the composition of aquatic biota, the physical or chemical nature of the substrate or the species composition or propagation of fishes. The Secretary must find, with public participation and inter-agency coordination, that under the selected alternative:

1. The amount of change to chemical/physical and biological qualities of the waterbody caused by the discharge or activity does not result in an undue adverse effect to the aquatic biota and protects and maintains existing and potential uses that have social, economic, and environmental benefits to the people of the state. This finding shall include consideration of:

- existing, future, and reasonably attainable water quality conditions,
- percent change in water quality conditions and relationship to the minimum requirements of the applicable criteria,
- level of impact to designated uses and values,
- level of impact to existing uses,
- risk posed to public health
- any loss or reduction of natural resource benefits that would result from lower water quality,
- project consistency with state, regional, and local plans,
- economic and social benefits to the people of the state of maintaining or

- attaining a higher quality resource, and economic and social benefits of the project to the people of the state.
2. **AND**, the amount of change to chemical/physical and biological qualities of the waterbody caused by the discharge or activity does not result in an adverse effect to the exceptional natural, cultural, scenic, or recreational values of Outstanding Resource Waters (designated pursuant to 10 V.S.A. Sec.1424a);
 3. **AND**, the discharge or activity is necessary to accommodate overriding economic and social development which is clearly in the public interest, and that:
 - (a) alternatives are not technologically feasible; and
 - (b) the project maintains and protects all existing and designated uses and values and the applicable water quality criteria;
 4. **AND**, the social and economic costs to the people of the state of the pollution control alternative chosen are not substantial, widespread, and prohibitive, and are offset by the benefits resulting from the maintenance or restoration of water quality conditions that result in no undue adverse effect to the aquatic biota and protect and maintain existing and designated uses.

7. Public Notice

The Public Notice for the proposed activity will contain the Secretary's proposed findings regarding compliance with the Policy (Water Quality Standards, § 1-03) and this Implementation Procedure. The Secretary may hold a public informational meeting on his or her own motion or in response to a request for the purpose of obtaining information on the:

- designated uses and values and existing uses of the water,
- social and economic importance of waterbody uses and values,
- project effects on uses and values,
- social and economic benefits of project alternatives.

The informational meeting shall be warned by publication in a newspaper with a general circulation covering the area of the proposed project.

APPENDIX D

Draft NPDES Direct Discharge Permit Application Procedure



State of Vermont

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Environmental Conservation
State Geologist
Natural Resources Conservation Council
RELAY SERVICE FOR THE HEARING IMPAIRED
1-800-253-0191 TDD>Voice
1-800-253-0195 Voice>TDD

AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation
WATER QUALITY DIVISION
103 South Main Street
Building 10 North
Waterbury, VT 05671-0408

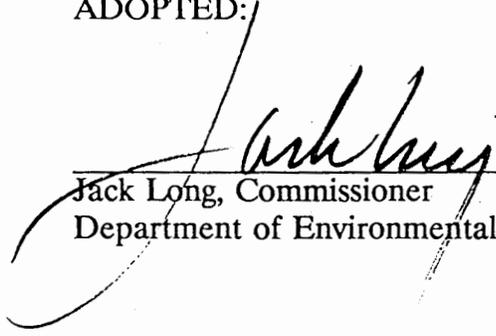
802-244-6951
Fax #:802-241-3287

**WATER QUALITY DIVISION
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AGENCY OF NATURAL RESOURCES
STATE OF VERMONT**

NPDES DIRECT DISCHARGE PERMIT APPLICATION PROCEDURE

May 16, 1994

ADOPTED:



Jack Long, Commissioner
Department of Environmental Conservation

5/19/94

Date

VTDEC NPDES PERMIT APPLICATION PROCEDURE

To apply for an NPDES discharge permit for a new or increased discharge and to satisfy the alternatives analysis and anti-degradation test requirements, the following sequential steps should be completed:

STEP 1: Initial Project Screening

Exchange preliminary information concerning the desired discharge with the Department of Environmental Conservation. The applicant should:

	1a. In consultation with the Waste Water Management Division, describe the influent quantity and quality, and the proposed level of treatment it would receive.
	1b. The Waste Water Management Division will provide the Water Quality, Public Facilities, and Water Supply Divisions with information pertaining to the desired discharge. ¹

STEP 2: Selecting a Discharge Alternative

Determine if the proposed project would create a measurable change in water quality, and if so, decide if there are alternatives to creating a direct discharge to surface waters, taking into account future groundwater needs. The applicant should:

	2a. In consultation with the Waste Water Management, Water Quality, Public Facilities, and Water Supply Divisions, define the scope of alternatives analyses to be completed. ² The Water Quality Division will advise you on the issues and requirements of the Anti-Degradation Policy which may include assessments of natural (chemical, physical, and biological), social, and economic resource impacts. (See Appendix A)
	2b. Investigate other permit requirements related to land use issues, including but not limited to agricultural soils, state protected wetlands, historic resources, etc. Consult with the appropriate State and Federal agencies on the feasibility of a desired site for your facilities.
	2c. Review the completed alternatives analyses with the Waste Water Management, Water Quality, Public Facilities, and Water Supply Divisions for consistency with the Vermont Ground Water Protection Rule and Strategy, the Water Quality Standards, the Indirect Discharge Rules, and the Anti-Degradation Policy. ³

1 - Shading indicates that this step will be completed by the VTDEC as part of the NPDES permit process.

2 - The Waste Water Management Division will hold a meeting with the potential applicant and representatives of the Water Quality, Public Facilities, and Water Supply Divisions to determine what alternatives analyses should be completed. Planning loans for preliminary engineering of POTW's may be available at this point in the process from the Public Facilities Division.

3 - The Water Quality Division will make findings that the completed alternatives analyses, which culminate in the selection of a discharge alternative are consistent with the Vermont Anti-Degradation Policy.

STEP 3: Establishing a Waste Management Zone

When the alternatives analysis indicates that a direct discharge is the preferred alternative the applicant should:

	3a. File an application for an NPDES permit (including completed forms, basis of design and application fee) with the Waste Water Management Division .
	3b. Consult with the Water Quality Division to determine if a new or lengthened waste management zone is required, and if so, what information is needed to satisfy the requirements of § 1252 (d).
	3c. In consultation with the Water Quality Division , respond to public comments that may be received during a public meeting required for the creation of a new or lengthened waste management zone.
	3d. The Water Quality Division will prepare findings concerning the proposed waste management zone and its consistency with the Vermont Water Quality Standards, Waste Management Zone Procedures, and the Anti-Degradation Policy.

STEP 4: Facilities Siting, Design, and NPDES Permit Application

Where the selected discharge alternative is a treatment and outfall facility to handle the new or increased discharge and the preliminary waste management zone findings indicate that the creation of a WMZ is in the public interest, the applicant should:

	4a. In consultation with the Public Facilities Division , create project plans that include the siting and complete design of your treatment facility and outfall. ⁴
	4b. Prepare other permit applications as needed such as State Wetland CUD, Corps of Engineers 404/401, Act 250, etc., (integrated with #4a).
	4c. Submit any additional information to the Waste Water Management Division that is necessary to complete the NPDES permit application.
	4d. Once the permit application is completed, the Waste Water Management Division will prepare a draft NPDES permit.
	4e. In consultation with the Waste Water Management Division hold a public hearing on the draft permit and waste management zone and respond to public comments that may be received as a result of the public hearing.
	4f. The Waste Water Management Division will issue an NPDES permit that will include the creation of a Waste Management Zone to receive the discharge.

4 - Design and engineering loans for POTW's may be available through the Public Facilities Division at this point in the process.

Appendix A

NPDES ANALYSIS RESPONSIBILITIES

Step 2a. - The Department of Environmental Conservation will determine what alternatives analyses should be completed in a joint meeting with the applicant and representatives from the Waste Water Management, Public Facilities, Water Supply, and Water Quality Divisions.

Alternatives Analyses - consulting Divisions

Groundwater Use Analysis - Water Supply Division (Resource Mgt. Sec.)

Indirect Discharge Feasibility Analysis - Waste Water Management Division (Indirect Discharge Sec.)

Pollution Prevention and Source Reduction Analysis - Waste Water Management Division

Treatment & Operational Enhancements Analysis - Waste Water Management Division (Operations Division) & Public Facilities Division (Engineering Sec.)

Project Social and Economic Benefits Analysis - Public Facilities Division (Engineering Sec.) & Water Quality Division

Treatment Facility & Outfall Location Analysis - Public Facilities & Water Quality Divisions

Assimilative Capacity Analysis - Water Quality Division (Engineering Section)

Mass Loading Analysis - Water Quality Division (Engineering Sec.)

Cumulative Water Quality Impacts Analysis - Water Quality Division (Planning & Engineering Secs.)

Bioaccumulative/Persistent Substances Analysis - Water Quality Division (Environ. Sci. Sec.)

Existing/Designated Uses & Public Interest Analyses - Water Quality Division (Planning Sec.)

Reduction of Natural Resources Benefits Analysis - Water Quality Division (Planning Sec.)

State, Regional, and Local Plans Consistency Analysis - Water Quality Division (Planning Sec.)

Existing/Designated Uses and Values Impact Analysis - Water Quality Division (Planning Sec.)

APPENDIX E

1994 Vermont Targeted-Impaired List of Waters [303(d) List]

**STATE OF VERMONT
TARGETED - IMPAIRED
WATERS**

prepared for:

State Clean Water Strategy (on-going)
&
1994 Section 303(d) Waters

Vermont Department of Environmental Conservation
Water Quality Division
Building 10 North
103 South Main Street
Waterbury, VT 05671-0408
(802) 241-3770
(802) 241-3287 FAX

April 1994

Listing Explanation

All waterbodies on the following list are subjects of the Vermont State Clean Water Strategy and are considered to be high priority and targeted for water pollution control.

Segments preceded by asterisks (**) denote a targeted ground water related problem. All other segments concern surface water.

An underlined Waterbody Identification Number indicates all listed segments and associated problems of that waterbody are on the Vermont Section 303(d)¹ listing of waters where control measures need to be developed.

An underlined Segment indicates just that segment and related problem or problems of the waterbody are on the Vermont 303(d) listing of waters where control measures need to be developed.

Segments and associated information enclosed by a box are Vermont Section 303(d) waters where control measures will be completed or developed before April 1996.

Explanation of Column Headings

Waterbody ID - An alphanumeric code used to spatially locate designated surface waterbodies. For example, VT01-02 and VT01-03L05 represent a river and a lake waterbody, respectively, that are located in Vermont river basin #1. There are 17 river basins identified in Vermont; river basin #1 includes the Batten Kill, Hoosic and Walloomsac rivers. The rivers and streams located in waterbody #VT01-02 comprise a watershed. Lake waterbody #VT01-03L05 is the fifth lake in a different watershed (i.e. watershed #3) of the same river basin.

Segment - The name of the river segment or lake. Segments preceded by asterisks (**) indicate ground water areas.

Problem(s) & Impairment(s) - A brief description of the problem(s) and/or impairments found in the particular segment.

Assessment Needed - Problem/impairment needing further assessment prior to implementation of control measures.

BMP Needed - Needed Best Management Practice(s), if known.

Program/Funds - Control program and/or funding mechanism for implementing BMPs to reduce or prevent water pollution or for conducting an assessment.

Current Status - Whether a program, funds, BMPs and/or assessment have been planned, designed or implemented.

Schedule/303(d) ranking - An indication of scheduled activities, if known, leading to restoration or development of control measures.

¹ Section 303(d), established by the 1972 Federal Water Pollution Control Act, requires each state to identify those waters for which pollution controls are not stringent enough to implement State water quality standards.

Vermont's first 303(d) list, submitted in October 1992 and revised in March 1993, received approval by the US EPA in May 1993.

Section 303(d) & Targeted-impaired Listing
31 MAR 94

Waterbody ID	Segment	Problem(s) & Impairment(s)	Assessment Needed	BMP Needed	Program/Funds	Current Status	Schedule - 1984 303(d) ranking
VT01-02	HOOSIC RIVER, ENTIRE 7 MILE LENGTH IN VERMONT	CHEMICAL SPILLS FROM MASS.	ASSESSMENT NEEDED BY MASS. AGENCIES		DEC-ENF; VT DF&W		UNSCHEDULED REMEDIATION; MASS. JURISDICTION
		LIMESTONE CRUSHING PLANT IN ADAMS, MA CREATES TURBIDITY FLUME DOWNRIVER		ENLARGE SETTLEMENT LAGOONS OR FILTER DISCHARGE	DEC-WQ	ON-GOING BIOL. MONITORING	UNSCHEDULED REMEDIATION; MASS. JURISDICTION
		RESIDENTIAL DIRECT DISCHARGES &/OR FAILED SEPTIC SYSTEMS IN POWNAL	INITIAL ASSESSM'T LATE 1970s; SANITARY SURVEY 1989; SECT 319 SURVEY 1991	REMOVE STRAIGHT PIPES; REPLACE FAILED SYSTEMS; CONSIDER MUNICIPAL SYSTEM	DEC-ENF; SECTION 319; DEC-PF	FIRE DISTRICT FORMED; DEC 1277 ORDER ISSUED (1993); TOWN APPEAL; ORDER STAYED	PRELIM PLANNING LIKELY 1994
VT01-03	** WALLOOMSAC RIVER, BENNINGTON	GRD WATER CONTAMINATED BEYOND DRINK'G WATER STDS; NOT SUITABLE AS SOURCE	ASSESSMENT DONE; TANSITOR ELECTRONICS SITE	CONTIN'D MONITOR'G	CERCLA; DEC-WS	CLASS IV GRD WATER	RE-ASSES CLASS'N CA. 1998
	**WALLOOMSAC RIVER, 2 MILES THROUGH BENNINGTON VILLAGE	BENNINGTON LANDFILL: GROUNDWATER CONTAMINATION FROM PAST INDUSTRIAL WASTE LAGOON	ASSESS EXTENT OF CONTAM'N, METHOD OF CLEAN-UP & IMPACT ON AQ, BIOTA; WAS MED-IMP		CERCLA; DEC-SW; DEC-WQ; DEC-HMM	NPL SITE; CONSENT ORDER SIGNED BY RPs TO CONDUCT RI/FS	SITE #770002 (DEC-HMM)
	WALLOOMSAC RIVER, 2 MILES THROUGH BENNINGTON VILLAGE	LEACHATE FROM BLDG DEBRIS LANDFILL ENTERING SURFACE WATER	SITE WAS HI-THREAT IN 1989	LEACHATE COLLECTION	DEC-SW	UNDER REVIEW FOR CONTINUED OPERATION W/OUT LINER	
VT01-03L01	BIG POND	PATHOGENIC CONTRIBUTIONS	SOURCE(S) NEED ASSESSMENT		DEC-ENF; LOCAL		

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<u>Waterbody ID</u>	<u>Segment</u>	<u>Problem(s) & Impairment(s)</u>	<u>Assessment Needed</u>	<u>BMP Needed</u>	<u>Program/Funds</u>	<u>Current Status</u>	<u>Schedule - 1994 303(d) ranking</u>
<u>VT01-03L04</u>	SHAFTSBURY LAKE	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
<u>VT01-03L05</u>	LAKE PARAN (BENNINGTON); SURFACE AREA = 40ac	MODERATE EURASIAN WATERMILFOIL INFEST'N; SINCE 1970s	CONT'D EVAL OF ADD'L MILFOIL CTRL OPTIONS; HERBIVORE RESEARCH PROJECT	LMTD BOTTOM SCREEN'G IN USE; TRIED DRAWDOWN & HANDPULL'G	US EPA; VT ANCF & EWMCP; MORE \$\$ NEEDED TO EVAL/IMPL BEST CTRL OPTIONS	WINTER DRAWDOWN STUDY DONE; WEEVIL PRESENT; NOTED NATURAL MILFOIL DECLINE (1993)	HERBIVORE RESEARCH PROJECT TO BE DONE 1995
<u>VT01-05L01</u>	BOURN POND	CRITICALLY ACIDIFIED		REDUCE EMISSIONS FROM OUT-OF-STATE SOURCES	DEC-WQ; ACID PRECIP. MONITOR'G; GMPF PROTECT. AIR QUAL. RELATED VALUES (LYE BRK)	ON-GOING ACID PRECIP. MONITOR'G; SULFUR EMISSIONS OFFSET (HALF MOON, NY)	1990 AMENDMENTS CLEAN AIR ACT; SO2 & NOX EMISS'N REDUC'N OVER 10-12 YR
<u>VT01-06L01</u>	BRANCH POND (SUNDERLAND)	CRITICALLY ACIDIFIED	ON-GOING; CHANGED FROM HIGH-THREAT ('94)	REDUCE EMISSIONS FROM OUT-OF-STATE SOURCES	DEC-WQ; ACID PRECIP. MONITOR'G	ON-GOING ACID PRECIP. MONITOR'G; 1990 CLEAN AIR ACT SO2 & NOX EMISS. REDUCT'N	REDUCT'N NEXT 10 - 12 YRS
<u>VT01-06L02</u>	BEEBE POND (SUNDERLAND)	CRITICALLY ACIDIFIED	ON-GOING; CHANGED FROM HIGH-THREAT ('94)	REDUCE EMISSIONS FROM OUT-OF-STATE SOURCES	DEC-WQ; ACID PRECIP. MONITOR'G	1990 CLEAN AIR ACT SO2 & NOX EMISSIONS REDUCT'N	REDUCT'N NEXT 10 - 12 YRS

Section 303(d) & Targeted-impaired Listing
31 MAR 94

Waterbody ID	Segment	Problem(s) & Impairment(s)	Assessment Needed	BMP Needed	Program/Funds	Current Status	Schedule - 1994 303(d) ranking
<u>VT02-01</u>	POULTNEY RIVER, AT MOUTH	PHOSPHORUS LOADING TO LAKE CHAMPLAIN; TOTAL P MASS LOAD = 35 MT/YR (#6)	DIAGN MONITOR'G DONE; TOTAL P EXPORT = 0.51 KG/HA/YR (#11); DISS P = 0.12 (#12)	REDUCE P FROM PT & NONPOINT SOURCES	EPA-SECTION 314-D/F	PRELIM PLANN'G FOR P REMOVAL AT POULTNEY & FAIR HAVEN WWTFs	TARGET RIVER MOUTH P REDUCT'N 1994
	POULTNEY RIVER-CARVERS FALLS AREA-3.1 MILES	AGRICULTURAL RUNOFF	ASSESSMENT UNDERWAY; PHOSPHORUS LOADING MODELING		USDA-ACP; PL83-566 POTENTIAL	PRELIMINAR Y PLANNING	DETAILED PLANNING UNSCHEDULED (SCS)
		DEWATERING OF LARGEST, HIGHEST WATERFALL IN STATE	AESTHETICS STUDY	IMPROVED FLOW REGIME	10 VSA SECTION 1003 CONFERENCE	FERC LICENSE PENDING; STATE ORW DESIGNATIO N (1991)	SEE BELOW
		FLOW REGULATION IMPAIRING ALL USES	FLOW STUDY NEEDED; SEGMENT HAS MOST DIVERSE MUSSELL COMMUNITY IN VT	IMPROVED FLOW REGIME	10 VSA SECTION 1003 CONF.	STATE ORW DESIGNATIO N (1991)	UNDER REVIEW FOR FERC LICENSING (1995); LICENSE APPL'N DUE 12/93
		POSSIBLE FISH PASSAGE PROBLEM	ASSESS PROBLEM; SEGMENT HAS SEVERAL RARE FISH SPECIES	MEASURES TO PREVENT IMPINGEMENT & ENTRAINMENT AND/OR TO ALLOW FOR PASSAGE	DEC-WQ; VT DF&W	FERC LICENSE PENDING; STATE ORW DESIGNATIO N (1991)	
		STREAMBANK EROSION	COST/BENEFIT PROHIBITS ASSESSMENT	REVEGETATE AND RIPRAP WHERE NECESSARY	USDA-ACP	ORW DESIGNATIO N (1991)	
<u>VT02-01L01</u>	COGGMAN POND	NUTRIENT ENRICHMENT	FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
<u>VT02-02L02</u>	SUNRISE LAKE (BENSON); SURFACE AREA = 52ac	MODERATE EURASIAN WATERMILFOIL INFEST'N; INFEST'N SINCE 1987	ANNUAL SURVEYS; HERBIVORE RESERACH PROJECT; EVAL OF MILFOIL CTRL OPTIONS	BOTTOM BARRIER IN USE; TRIED HANDPULLING	US EPA; VT ANCF & EWMCP; MORE \$\$ NEEDED TO EVAL/IMPL BEST CTRL METHODS	INFESTA'N NO LONGER CONTROLABL E MANUALLY; WEEVIL PRESENT	HERBIVORE RESEARCH PROJECT TO BE DONE 1995

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Waterbody ID	Segment	Problem(s) & Impairment(s)	Assessment Needed	BMP Needed	Program/Funds	Current Status	Schedule - 1994 303(d) ranking
<u>VT02-02L04</u>	BURR POND	NUTRIENT ENRICHMENT	FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION; LAKE ASSOC.		
	BURR POND (SUDBURY); SURFACE AREA = 74ac	MODERATE EURASIAN WATERMILFOIL INFEST'N; INFEST'N SINCE 1991	ANNUAL SHORELINE INSPECTIONS FOR NEW INFESTATIONS		MILFOIL WATCHERS PROGRAM, SUMMER LAKES AND PONDS CREW SURVEYS	HANDPULLING	
<u>VT02-02L05</u>	LAKE HORTONIA (HUBBARDTON)	HEAVY EURASIAN MILFOIL INFEST'N; SINCE 1984	HERBIVORE RESEARCH PROJECT; CONT'D EVAL OF ADD'L MILFOIL CTRL OPTIONS	MECHANICAL WEED HARVESTING & LIMITED BOTTOM SCREENING IN USE, BUT INADEQUATE	US EPA; VT ANCF & EWMCP; MORE \$\$ NEEDED TO EVAL/IMPL BEST CTRL OPTIONS	PRESENCE OF 2 RARE AQUATIC PLANT SPECIES	HERBIVORE RESEARCH PROJECT TO BE DONE 1995
<u>VT02-02L07</u>	PARSON'S MILL POND (BENSON)	MODERATE EURASIAN MILFOIL INFEST'N; SINCE 1989	HERBIVORE RESEARCH PROJECT; CONT'D EVAL OF ADD'L MILFOIL CTRL OPTIONS		US EPA; VT ANCF & EWMCP; MORE \$\$ NEEDED TO EVAL/IMPL BEST CTRL METHODS	NO CONTROL PROGRAM AT PRESENT	HERBIVORE RESEARCH PROJECT TO BE DONE 1995
<u>VT02-03L01</u>	ECHO LAKE (KEELER POND)	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION; LAKE ASSOC.		
<u>VT02-03L05</u>	LAKE BOMOSEEN (CASTLETON)	HEAVY EURASIAN MILFOIL INFEST'N; SINCE 1982	HERBIVORE RESEARCH PROJECT; EVAL OF MILFOIL CTRL OPTIONS	MECHANICAL WEED HARVESTING & LIMITED BOTTOM SCREENING IN USE, BUT INADEQUATE	US EPA; VT ANCF & EWMCP; MORE \$\$ NEEDED TO EVAL/IMPL BEST CTRL METHODS	WEEVIL PRESENT; 5 RARE AQUATIC PLANT SPECIES PRESENT; DRAWDOWN STOP (1992)	WINTER DRAWDOWN & EVAL (1989); HERBIVORE RESEARCH PROJECT DONE 1995
<u>VT02-03L06</u>	GLEN LAKE	HEAVY EURASIAN MILFOIL INFEST'N; SINCE 1983	HERBIVORE RESEARCH PROJECT; CONT'D EVAL OF MILFOIL CTRL OPTIONS		US EPA; VT ANCF & EWMCP; MORE \$\$ NEEDED TO EVAL/IMPL BEST CTRL METHODS	NO CONTROLS AT PRESENT; WEEVIL PRESENT	HERBIVORE RESEARCH PROJECT DONE 1995

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Waterbody ID	Segment	Problem(s) & Impairment(s)	Assessment Needed	BMP Needed	Program/Funds	Current Status	Schedule - 1994 303(d) ranking
<u>VT02-05</u>	METTAWEE RIVER, 9.0 MI UPSTREAM OF NY/VT BORDER	AGRICULTURAL RUNOFF	METTAWEE R. RESTORATION PROJECT HAS ASSESSED PROBLEMS	ANIMAL WASTE MGMT., SOIL CONSERVATION PRACTICES, BUFFER STRIPS	USDA-ACP; PL83-566 POTENTIAL	PRELIMINARY PLANNING (566); ON-GOING (ACP); USDA/RC&D PENDING	DETAILED PLANN. UNSCHED (SCS); UNSCHED.COMPL'N DATES (ACP)
		LOSS OF RIPARIAN VEGETATION/BANK EROSION	METTAWEE R. RESTORAT'N PROJECT (YR?) HAS ASSESSED CONDITIONS	REVEGETATE BANKS, RIPRAP WHERE NECESSARY	NY DEC; VT DF&W; VT DEC/WQ; JOINT L.CHAMPL. CAC PARTNERSHIP	'MINI' STRAT. PLAN DONE; ON-GOING BIOL. MONITOR'G; AERIAL SURVEY (NY)	STABILIZE SITE (NY)
<u>VT02-05L01</u>	LILY POND (POULTNEY)	EXCESSIVE ALGAE GROWTH & NUTRIENT ENRICHMENT	SOURCES OF NUTRIENTS NEED TO BE DETERMINED		DEC-WQ/LAKE PROT. PRGM; LAKE ASSOC.	LOCAL INTEREST NEEDS TO BE SOUGHT	
		HEAVY EURASIAN MILFOIL INFEST'N; SINCE 1983	HERBIVORE RESEARCH PROJECT; CONT'D EVAL OF MILFOIL CTRL OPTIONS	MECHAN'L WEED HARVEST'G & LMTD HYDRO-RAK'G IN USE; EXPENSIVE & INTENSIVE; ADEQ-?	US EPA; VT ANCF & EWMCP; MORE \$\$ NEEDED TO EVAL/IMPL BEST CTRL METHODS	ON-GOING; HERBIVORE RESEARCH PROJECT DONE 1995	
<u>VT02-05L02</u>	LITTLE (WELLS)	HEAVY EURASIAN MILFOIL INFEST'N; SINCE 1983	HERBIV. RES. PROJECT; CONT'D EVAL OF MILFOIL CTRL OPTIONS; CONSIDER LOWLAND BOG	MECH'L WED HARVEST'G & LMTD HYDRO-RAK'G IN USE; EXPENSIVE & INTENSIVE; ADEQ-?	ANCF & EMCP - MORE FUNDING NEEDED TO EVALUATE/IMPLEM ENT BEST CONTROL METHODS	ON-GOING SINCE 1989; PRESENCE OF 2 RARE AQUATIC PLANT SPECIES	HERBIVORE RESEARCH PROJECT DONE 1995
<u>VT02-05L03</u>	LAKE ST. CATHERINE (POULTNEY)	HEAVY EURASIAN MILFOIL INFEST'N; SINCE 1983	HERBIV. RESEARCH PROJECT; CONT'D EVAL OF MILFOIL CTRL OPTIONS	MECH. WEED HARVEST'G, LMTD HYDRO-RAK'G & BOTTOM BARRIERS IN USE; \$\$&INTENS; ADQ?	ANCF & EMCP - MORE FUNDING NEEDED TO EVALUATE/IMPLEM ENT BEST CONTROL METHODS	ON-GOING SINCE 1989; PRESENCE OF RARE AQUATIC PLANT SPECIES	HERBIVORE RESEARCH PROJECT DONE 1995

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Waterbody ID	Segment	Problem(s) & Impairment(s)	Assessment Needed	BMP Needed	Program/Funds	Current Status	Schedule - 1994 303(d) ranking
VT03-00	LITTLE MUD (TABOR)	CRITICALLY ACIDIFIED		REDUCE EMISSIONS FROM OUT-OF-STATE SOURCES	DEC-WQ; ACID PRECIP. MONITOR'G	CLEAN AIR ACT AMENDMENTS ; MANDATED SO2 & NOX EMISSIONS REDUCT'N	EMISSIONS REDUCT'N PHASED IN NEXT 10 - 12 YRS
	NORTON BROOK DAM, VERGENNES	HEAVY EURASIAN MILFOIL INFEST'N; SINCE 1985	HERBIVORE RESEARCH PROJECT; EVAL MILFOIL CTRL OPTIONS		US EPA; VT ANCF; VT EWMCP;	WEEVIL INTRODUCED TO EVAL CTRL EFFECTIVENESS	NO PUBLIC ACCESS
VT03-01	LOWER OTTER CREEK-FROM MOUTH TO 5 MILES UPSTREAM	AGRICULTURAL RUNOFF	SMALL WATERSHED ASSESSMENT 1980; WATERSHED PLAN 1981	AGRIC. WASTE MANAGEMENT, CROPLAND EROSION CONTROL, FIELD NUTRIENT MAN.	USDA-ACP; PL83-566 1981-1991	60/130 W/SHED FARMS CONTRACTED ; 41/60 CONTRACTS INSTAL'D	
		STREAMBANK EROSION	SMALL WATERSHED ASSESSMENT 1983	RIP RAP BANKS, REVEGETATE, EXCLUDE LIVESTOCK	USDA	ON-GOING; SEGMENT HAS 2nd MOST DIVERSE MUSSELL COMMUNITY	ON-GOING; UNSCHEDULED COMPLETION DATES, DEPENDENT ON FED.&PRIVATE \$
	LOWER OTTER-BELOW VERGENNES DAM FOR 0.1 MILES	DEWATERING OF FALLS	AESTHETICS STUDY NEEDED	IMPROVE FLOW REGIME	DEC-WQ	LICENSED FACILITY	LICENSE EXPIRES 5/31/99
OTTER CREEK BELOW MIDDLEBURY WASTEWATER TREATMENT FACILITY		MIDDLEBURY WWTF COLL'N SYSTEM PASSES COMBINED SEWER OVERFLOWS	PRELIM PLANN'G DONE	CSO ABATEMENT	DEC-PF; SRF; STATE CONSTR. GRANTS PRGM	FINAL DESIGN UNDERWAY	PROPOSED CONSTRUCTION 1994; NO TOWN VOTE/APPROVAL YET
OTTER CREEK, AT MOUTH		PHOSPHORUS LOADING TO LAKE CHAMPLAIN; TOTAL P MASS LOAD = 131.2 MT/YR (#2)	DIAGN MONITOR'G DONE; TOTAL P EXPORT = 0.53 KG/HA/YR (#10); DISS P = 0.31 (#7)	REDUCE P FROM PT & NONPOINT SOURCES	EPA-SEC.314-D/F	VERGENNES WWTF AWT NOW; PRELIM PLAN'G P REMOVAL MIDDLEBURY WWTF	TARGET RIVER MOUTH P REDUCT'N # 1994

Section 303(d) & Targeted-impaired Listing
31 MAR 94

Waterbody ID	Segment	Problem(s) & Impairment(s)	Assessment Needed	BMP Needed	Program/ Funds	Current Status	Schedule - 1994 303(d) ranking
VT03-01	OTTER CREEK, BELOW MIDDLEBURY LOWER HYDRO	FLOW REGULATION IMPAIRS DOWNSTRM AESTHETIC & RECREATIONAL VALUES	FLOW STUDY & AESTHETICS STUDY NEEDED; DETERMINE IF ASSIMILATIVE CAP. REDUCED	IMPROVE FLOW REGIME	FERC LICENSE & WQ CERTIFICATE	FERC LICENSE ISSUED 7/80; WQ CERTIF. ISSUED 12/74	
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	NEEDS ASSESSMENT	MEASURES TO PREVENT IMPINGEMENT & ENTRAINMENT AND ALLOW PASSAGE	ANR/DF&W & DEC CAN REQUIRE MEASURES THRU FERC LICENSE & RECERTIFICATION		
VT03-01	OTTER CREEK, FROM WEYBRIDGE DAM TO 2 MILES DOWNSTREAM	FLOW REGULATION	FISHERIES FLOW NEEDS ASSESSMENT COMPLETE	IMPROVE FLOW REGIME	ANR-DEC SEEKING WATER QUALITY RECERTIFICATION ; FERC LICENSE	NEGOT. IN PROG. W/ UTILITY PER FERC LIC. ; PROJECT DOESN'T COMPLY W/ W.Q. CERT.	LICENSE EXPIRES 5/31/2000
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	NEEDS ASSESSMENT	MEASURES TO PREVENT IMPINGEMENT & ENTRAINMENT AND ALLOW PASSAGE	ANR- F & W/ DEC CAN REQUIRE MEASURES THROUGH FERC LICENSE & RECERTIFICATION		
VT03-04	LEICESTER RIVER, FROM DAM ON LAKE DUNMORE TO 1.0 MILE DOWNSTREAM	FLOW REGULATION	FLOW STUDY NEEDED	IMPROVED FLOW REGIME	10 VSA SECTION 1003 CONF.	FERC DETERMINED NOT UNDER THEIR JURISDICTION	
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	ASSESSMENT NEEDED	MEASURES TO PREVENT IMPINGEMENT & ENTRAINMENT & ALLOW FOR PASSAGE	ANR-FISH & WILDLIFE, DEC-WATER QUALITY	FERC DETERMINED NOT UNDER THEIR JURISDICTION	
VT03-04	LEICESTER RIVER, FROM SALISBURY DAM TO 5 MILES DOWNSTREAM	FLOW REGULATION	FLOW STUDY NEEDED	IMPROVE FLOW REGIME	10 VSA SECTION 1003 CONF.	FERC DETERMINED NOT UNDER THEIR JURISDICTION	
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	ASSESSMENT NEEDED	MEASURES TO PREVENT IMPINGEMENT & ENTRAINMENT & ALLOW FOR PASSAGE	ANR-FISH & WILDLIFE, DEC-WATER QUALITY	FERC DETERMINED NOT UNDER THEIR JURISDICTION	

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VT03-04	OTTER CREEK - WEST OF BRANDON VILLAGE	EVIDENCE OF BRANDON LANDFILL LEACHATE ENTERING SURFACE WATER			DEC-SW	DISCONT'D RECEV'G WASTE 7/92	
	SILVER LAKE STREAM, FROM DAM ON LAKE TO 1.2 MILES DOWNSTREAM	FLOW REGULATION	FLOW STUDY NEEDED	IMPROVED FLOW REGIME	10 VSA SECTION 1003 CONF.	UNDER REVIEW FOR FERC LICENSE	LICENSE APPL'N & 401 DUE 12/93; LICENSE ISSUE 1995
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	NEEDS ASSESSMENT	MEASURES TO PREVENT IMPINGEMENT & ENTRAINMENT & ALLOW PASSAGE	DEC-WQ; VT DF&W	FERC DETERMINED NOT UNDER THEIR JURISDICTION	
	SUCKER BROOK, 1.5 MILES BELOW HYDRO DAM	FLOW REGULATION	FLOW STUDY NEEDED	IMPROVED FLOW REGIME	10 VSA SECTION 1003 CONF.	UNDER REVIEW FERC LICENSE	LICENSE ISSUED 1995; LICENSE APPL'N & 401 DUE 12/93
		POSSIBLE DO* PROBLEMS DUE TO HYPOLIMNETIC WITHDRAWAL	WATER QUALITY STUDY NEEDED	POSSIBLY AERATE DISCHARGE	DEC-WQ; 1003 CONFERENCE	UNDER REVIEW FOR FERC LICENSE	LICENSE ISSUED 1995; LICENSE APPL'N & 401 DUE 12/93
VT03-04L01	SUGAR HILL RESERVOIR	WATER LEVEL FLUCTUATION IMPAIRS FISHERY	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT IN RESERVOIR	REDUCE DRAWDOWN MAGNITUDE	10 VSA SECTION 1003 CONF.	UNDER REVIEW FOR FERC LICENSE	LICENSE APPL'N & 401 DUE 12/93; LICENSE ISSUE 1995
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	NEEDS ASSESSMENT	MEASURES TO PREVENT IMPINGEMENT & ENTRAINMENT & ALLOW PASSAGE	DEC-WQ; VT DF&W	UNDER REVIEW FOR FERC LICENSE	LICENSE ISSUED 1995; LICENSE APPL'N & 401 DUE 12/93

* Dissolved Oxygen.

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VT03-05	OTTER CREEK - RUTLAND	HAZARDOUS WASTE SPILL WITH SURF. WATER IMPACT			PETROL. CLEANUP FUND; RESPON. PARTIES	UNDER 10 VSA 1941 MGMT; CONTAM'N FOUND DURING TANK REMOVAL	SITE #911176
	OTTER CREEK BELOW RUTLAND CITY WWTF	RUTLAND CITY WWTF COLL'N SYSTEM PASSES COMBINED SEWER OVERFLOWS		CSO ABATEMENT	DEC-PF; SRF; STATE CONSTR. GRANTS PRGM; DEC-WQ	PHASE I CONSTRUCTI ON COMPLETE; OVERALL PROJECT UNDER REVIEW BY CITY	PHASE II WAS 1995; CITY LIKELY TO PROPOSE NEW SCHEDULE
	OTTER CREEK, BELOW PROCTOR DAM	DEWATERING OF LARGE WATERFALL	AESTHETICS STUDY NEEDED	IMPROVED FLOW REGIME	FERC LICENSE & W.Q.CERTIFICATI ON	PENDING	LICENSE EXPIRES 3/31/2012
	OTTER CREEK, FROM CENTER RUTLAND DAM DOWNSTREAM FOR 0.4 MILES	FLOW REGULATION		IMPROVE FLOW REGIME	FERC LICENSE & W.Q.CERTIFICATI ON	RE-LICESNING IN PROGRESS	LICENSE APPL. TO BE FILED BY 1991
VT03-06	MOON BROOK, MOUTH TO RUTLAND CITY LANDFILL	LAND DEVELOPMENT; EROSION/SEDIMEN TATION	NEEDS FURTHER ASSESSM'T; HIGH-THREAT ('89)		ACT 250; LOCAL; DEC-ENF; DEC-WQ	ON-GOING BIOL. MONITORING	
		LANDFILL LEACHATE ENTERING SURFACE WATER	WAS HI-THREAT IN 1989; NEEDS FURTHER ASSESSMENT		DEC-SW; DEC-WQ	DEC SI REPORT DONE 1/89; ADD'L SAMPLING DONE BY DEC-SW; PRELIM. BIOL. ASS'MT '88	SITE #770020; DISCONT'D RECEV'G WASTE 1990
VT03-07	LITTLE OTTER CREEK, AT MOUTH	PHOSPHORUS LOAD'G TO LAKE CHAMPLAIN; TOTAL P MASS LOAD = 10.8 MT/YR (#10)	DIAGN MONITOR'G DONE; TOTAL P EXPORT = 0.56 KG/HA/YR (#8); DISS P = 0.36 (#5)	REDUCE P FROM NONPT SOURCES IN W/SHED	EPA-SEC 314-D/F; SEC 319; USDA		TARGET RIVER MOUTH P REDUCT'N # 1994

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<u>VT03-08</u>	LEWIS CREEK, AT MOUTH	PHOSPHORUS LOAD'G TO LAKE CHAMPLAIN; TOTAL P MASS LOAD = 11.6 MT/YR (#9)	DIAGN MONITOR'G DONE; TOTAL P EXPORT = 0.56 KG/HA/YR (#9); DISS P = 0.16 (#9)	REDUCE P FROM NONPT SOURCES IN W/SHED	EPA-SEC 314-D/F; SEC 319; USDA		TARGET RIVER MOUTH P REDUCT'N # 1994
<u>VT03-08L01</u>	WINONA LAKE (BRISTOL POND)	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
<u>VT03-08L02</u>	CEDAR LAKE (MONKTON)	NUISANCE ALGAE & NATIVE WEED GROWTH; EXCESS'V NUTRIENT ENRICHM'T	SOURCES OF NUTRIENTS NEED TO BE DETERMINED		DEC-WQ LAKE PROTECTION PRGM; LAKE ASSOC.	LOCAL INTEREST NEEDS TO BE SOUGHT; LAKE ASSOC. FORMED 7/89	
<u>VT03-09</u>	DEAD CREEK, STONE BRIDGE POND TO MOUTH	STREAMBANK EROSION, LOSS OF RIPARIAN VEGETATION	SMALL WATERSHED ASSESSMENT 1983	REVEGETATE, RIPRAP WHERE NECESSARY	USDA	ON-GOING; SEGMENT IS IMPT NEST, FEED, REST HABITAT FOR SEVERAL WATERBIRD SP.	ON-GOING; UNSCHEDULED COMPLETION DATES, DEPENDENT ON FED.&PRIVATE \$
		AGRICULTURAL RUNOFF	SMALL WATERSHED ASSESSMENT 1980; WATERSHED PLAN 1981	AGRICULTURAL WASTE MANAGEMENT, CROPLAND EROSION CONTROL, FIELD NUTRIENT MANAGEM.	USDA-ACP; PL83-566 1981-1991	SEE VT03-01	
<u>VT03-10</u>	LEMON FAIR RIVER FROM RICHVILLE POND OUTLET TO MOUTH	AGRICULTURAL RUNOFF	SCS SMALL WATERSHED ASSESSMENT 1980; WATERSHED PLAN 1985	INSTALL ANIMAL WASTE MANAGEMENT SYSTEMS AND CONSERVATION CROPPING SYSTEMS	PL83-566 SINCE 1985; USDA-ACP	18/104 W/SHED FARMS CONTRACTED ; 8/18 CONTRACTS INSTAL'D	PL83-566 DONE 1995

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<u>VT03-10</u>	LEMON FAIR RIVER FROM RICHVILLE POND OUTLET TO MOUTH	STREAMBANK EROSION AND LOSS OF RIPARIAN VEGETATION	SCS SMALL WATERSHED ASSESSMENT	RIPRAP WHERE NECESSARY; REVEGETATE BANKS; INSTALL BUFFER STRIPS	USDA	ON-GOING; PRESENCE OF STATE THREATENED RIPARIAN SPECIES	ON-GOING; UNSCHED. COMPLETION DATES, DEPENDENT ON FED. & PRIVATE \$
<u>VT03-10L01</u>	RICHVILLE POND	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
	RICHVILLE POND (SHOREHAM); SURFACE AREA = 124ac	MODERATE EURASIAN WATERMILFOIL INFEST'N; INFEST'N SINCE 1988	REGULAR SHORELINE SURVEYS	NO CONTROL PROGRAM AT PRESENT (1993)	ANCP & EMCP - MORE \$\$ NEEDED TO EVAL/IMPL BEST CONTROL METHODS		
<u>VT03-11L01</u>	NORTH (BRISTOL)	CRITICALLY ACIDIFIED	ON-GOING; CHANGED FROM MEDIUM-THREAT ('94)	REDUCE OUT-OF-STATE EMISSIONS	VT ACID PRECIPITATION MONITORING PROGRAM		
<u>VT03-14</u>	EAST CREEK, FROM CHITTENDEN RESERVOIR TO 7.4 MILES DOWNSTREAM	FLOW REGULATION; ONLY LOCAL DRAINAGE	FLOW STUDY NEEDED	IMPROVED FLOW REGIME	10 VSA SECTION 1003	FERC DETERMINED NOT UNDER THEIR JURISDICTION	
		POSSIBLE LOW D.O. FROM HYPOLIMNETIC WITHDRAWAL	WATER QUALITY STUDY NEEDED	POSSIBLY AERATE DISCHARGE	DEC-WQ; 1003 CONFERENCE	FERC DETERMINED NOT UNDER THEIR JURISDICTION	
	EAST CREEK, FROM GLEN DAM TO 3.0 MILES DOWNSTREAM	FLOW REGULATION	FLOW STUDY NEEDED	IMPROVED FLOW REGIME	10 VSA SECTION 1003 CONF.	FERC DETERMINED NOT UNDER THEIR JURISDICTION	
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	ASSESS PROBLEM	MEASURES TO PREVENT IMPINGEMENT & ENTRAINMENT & ALLOW FOR PASSAGE	VT DF&W; DEC-WQ	FERC DETERMINED NOT UNDER THEIR JURISDICTION	

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VT03-14	EAST CREEK, FROM PATCH DAM TO 2.4 MILES DOWNSTREAM	FLOW REGULATION	FLOW STUDY NEEDED	IMPROVED FLOW REGIME	10 VSA SECTION 1003 CONF.	FERC DETERMINED NOT UNDER THEIR JURISDICTION	
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	NEEDS ASSESSMENT	MEASURES TO PREVENT IMPINGEMENT AND ENTRAINMENT AND TO ALLOW PASSAGE	VT DF&W; DEC-WQ	FERC DETERMINED NOT UNDER THEIR JURISDICTION	
VT03-14L03	CHITTENDEN RESERVOIR (CHITTENDEN)	WATER LEVEL FLUCTUATION BY HYDRO IMPAIRS FISHERY	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT IN RESERVOIR	REDUCE DRAWDOWN MAGNITUDE	10 VSA SECTION 1003 CONFERENCE; ANR-DF&W, DEC-WQ	FERC DETERMINED NOT UNDER THEIR JURISDICTION	
VT03-17L01	STAR LAKE	NUISANCE NATIVE PLANT GROWTH, NUTRIENT ENRICHMENT	SOURCE(S) NEED IDENTIFICATION, WATERSHED ASSESSMENT NEEDED	HYDRO-RAKING IN USE	PRIVATE FUNDS		
VT03-18L03	BIG MUD	CRITICALLY ACIDIFIED	ON-GOING; CHANGED FROM HI-THREAT ('94)	REDUCE EMISSIONS FROM OUT-OF-STATE SOURCES	DEC-WQ; ACID PRECIP. MONITOR'G	ON-GOING ACID PRECIP. MONITOR'G; 1990 CLEAN AIR ACT SO2 & NOX EMISSION REDUCT'N	REDUCT'N NEXT 10 - 12 YRS
VT04-01L01	OTTER CREEK - LAKE CHAMPLAIN	NUISANCE WEED AND ALGAE GROWTH, TURBIDITY, NUTRIENT ENRICHMENT	PROBLEM & SOURCES NEED FURTHER ASSESSMENT, LAKEWIDE SAMPLING AND MODELING NEEDED	POINT & NPS PHOSPHORUS REDUCTION	SPECIAL DESIGN. ACT (1990); SECTION 314	BEGAN 2 YR DIAGNOSTIC SAMPLING 10/89; ADV. LAY MONITOR. SINCE 1979	ANALYSIS & MODELING; P ALLOCATION

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<u>VT04-01L02</u>	PORT HENRY - LAKE CHAMPLAIN	NUISANCE WEED AND ALGAE GROWTH, NUTRIENT ENRICHMENT	PROBLEM & SOURCES NEED FURTHER ASSESSMENT, LAKE-WIDE SAMPLING & MODELING NEEDED	POINT & NPS PHOSPHORUS REDUCTION	SPECIAL DESIGN. ACT (1990); SECTION 314	BEGAN 2 YR DIAGNOSTIC SAMPLING 10/89; ADV. LAY MONITOR. SINCE 1979	SEE 04-01L01
<u>VT04-02L01</u>	SOUTH LAKE - LAKE CHAMPLAIN	TURBIDITY, SOME NUISANCE WEED AND ALGAE GROWTH, NUTRIENT ENRICHMENT	PROBLEM & SOURCES NEED FURTHER ASSESSMENT, LAKE-WIDE SAMPLING & MODELING NEEDED	POINT & NPS PHOSPHORUS REDUCTION	SPECIAL DESIGN. ACT (1990); SECTION 314	SEE 04-01L01	SEE 04-01L01
		WATER CHESTNUT INFESTATION		CONTINUED HARVESTING NECESSARY TO INCREASE CONTROL AREA & PREVENT NORTH. SPREAD	US ACOE; VT DEC; US EPA; L.C. MGMT CONFERENCE	ON-GOING 1989	
<u>VT04-03</u>	EAST CREEK - ORWELL - FROM DAM TO DAM AT WATERFOWL AREA	SEDIMENTATION; HIGH NUTRIENT LOADS FROM AGRICULTURE	SEGMENT SUPPORTS SEVERAL WATERBIRD SP.; 2 UNCOMMON FISH SP.; 4 RARE AQ PLT SP.	AG WASTE MGMT; CROPLAND EROSION CTRL; FIELD NUTRIENT MGMT	USDA-ACP;-HUA;-WQIP;-SpP	47/87 W/SHED FARMS CONTRACTED ; 11/47 CONTRACTS INSTAL'D	-SpP AUTHOR'D ('90); \$300K FY92; NO \$\$ FY94
	EAST CREEK, AT MOUTH	PHOSPHORUS LOAD'G TO LAKE CHAMPLAIN; TOTAL P MASS LOAD = 2.1 MT/YR (#14)	DIAGN MONITOR'G DONE; TOTAL P EXPORT = 0.26 KG/HA/YR (#16); DISS P = 0.17 (#8)	REDUCE P FROM NONPT SOURCES IN W/SHED	EPA-SEC 314-D/F; SECT 319; USDA	NO CURRENT PLANS TO MODIFY ORWELL WWTF	TARGET RIVER MOUTH P REDUCT'N # 1994
<u>VT05-01</u>	ROCK RIVER - MOUTH TO VT/QUE BORDER	AGRICULTURAL RUNOFF; FISH KILL (1991)	ASSESSMENT NEEDED		USDA-ACP; -HUA; -WQIP	PART OF LOWER MISSISQUOI -HUA	SEE VT06-01

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<u>VT05-01</u>	ROCK RIVER, AT MOUTH	HIGH PHOSPHORUS LOADING TO LAKE CHAMPLAIN; TOTAL P MASS LOAD = 34.6 MT/YR (#7)	DIAGN MONITOR'G DONE; TOTAL P EXPORT = 2.28 KG/HA/YR (#1); DISS P = 0.67 (#2)	REDUCE P FROM NONPT SOURCE IN W/SHED	EPA-SEC 314-D/F; SEC 319; USDA	NO KNOWN PT SOURCES IN W/SHED	TARGET RIVER MOUTH P REDUCT'N # 1994
<u>VT05-01L01</u>	MISSISQUOI BAY - LAKE CHAMPLAIN	EURASIAN MILFOIL INFESTATION	HERBIVORE RESEARCH PROJECT; EVAL'N MILFOIL CTRL OPTIONS; CONSIDER RARE SPECIES	NONE CURRENTLY IN USE	USEPA; VT ANCF; VT EWMCP; MORE \$\$ NEEDED TO EVAL/IMPL BEST CTRL METHODS	ON-GOING 1992; WEEVIL PRESENT	HERBIVORE RESEARCH PROJECT TO BE DONE 1995
		NUISANCE WEED AND ALGAE GROWTH, NUTRIENT ENRICHMENT, TURBIDITY	VT & NY DEC PHOS. STUDY, LAKEWIDE SAMPLING, MODELING	VT 1992 P REDUCTION BILL (WWTF P UPGRADE); NPS CTRLS IN PRIORITY RIVER BASINS	US EPA CLEAN LAKES PRGM; L.C. MGMT CONF.; L.C. SP. DESIGN. ACT (1990)	START 2 YR DIAGNOSTIC SAMPLING 10/89; WHOLE LAKE MODELING 1992; P ALLOC'N 1993	JOINT P STUDY DONE 1993
VT05-02	PIKE RIVER	CANADIAN PROCESSING PLANT		NEED COOP AGREEMT RE: CLEANUP		L.CHAMPLAI N VT-QUE MOU SIGNED	UNSCHEDULED QUE JURISDICTION
		NUTRIENT ENRICHMENT FROM CANADIAN AGRICULTURAL RUNOFF		NEED COOP AGREEMT W/ QUE RE: CLEANUP		L.CHAMPLAI N VT-QUE MOU SIGNED	UNSCHEDULED QUE JURISDICTION
	PIKE RIVER, AT MOUTH (QUE)	HIGH PHOSPHORUS LOAD'G TO LAKE CHAMPLAIN; TOTAL P MASS LOAD = 69.2 MT/YR (#4)	DIAGN. MONITOR'G DONE	REDUCE P LOADS FROM PT & NONPOINT SOURCES	EPA-SECT.314-D/F	TOTAL P EXPORT = 1.34 KG/HA/YR (#2); DISS. P EXPORT = 0.52 (#3)	MODEL'G DONE SPR. '93; TARGET P REDUCT'N # LATE '93

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<u>VT05-02L01</u>	LAKE CARMİ (FRANKLIN)	NUSIANCE WEED GROWTH & ALGAE BLOOMS; NUTRIENT ENRICHMENT; D.O. DEPLETION	FURTHER ASSESSMENT RE: INTERNAL CYCLING OF PHOSPHORUS		USDA-ACP; -WQIP; -HUA; DEC-WQ LAKE PROT. PRGM; LAKE ASSOC.	RC&D DONE; ADV. LAY MONITOR. SINCE 1979; VISUAL WQ & WALLEYE FISH. IMPROVEMNT	ON-GOING (ACP); WQIP (START 1992)
<u>VT05-04L01</u>	NORTHEAST ARM - LAKE CHAMPLAIN	EURASIAN MILFOIL INFESTATION	HERBIVORE RESEARCH PROJECT; EVAL'N OF AVAILABLE CTRL OPTIONS		US EPA; VT ANCF & EWMP; MORE \$\$ NEEDED TO EVAL/IMPL BEST CTRL METHODS	WEEVIL PRESENT	HERBIVORE RESEARCH PROJECT TO BE DONE 1995
		NUSIANCE WEED & ALGAE GROWTH, NUTRIENT ENRICHMENT, TURBIDITY	PHOSPHORUS STUDY ON-GOING	VT 1992 P REDUC'N BILL (WWTF P UPGRADE); NPS CTRL PRGM PRIORITY RIVER BASINS	USDA-ACP; ACP SP. PROJECT; -WQIP; US EPA CLEAN LAKES PRGM; CHAMPL. SP. DESIGN.	REFER TO VT05-04L02 & VT05-07; ACP ON-GOING	SEE ALSO VT05-01L01
<u>VT05-04L02</u>	ISLE LA MOTTE - LAKE CHAMPLAIN	NUISANCE WEED AND ALGAE GROWTH IN SOME AREAS, NUTRIENT ENRICHMENT	PHOSPHORUS STUDY ON-GOING	AG WASTE MGMT; CROPLAND EROSION CTRL; FIELD NUTRIENT MGMT	USDA-ACP SPECIAL PROJECT (GRAND ISLE CTY)	APPROVED FOR IMPL. 5/88; 41/90 FARMS CONTRACTED	ESTM COMPLETION 2000
			PROBLEM AND SOURCES NEED FURTHER ASSESSMENT, LAKEWIDE SAMPLING & MODELING NEEDED	POINT & NPS PHOSPHORUS REDUCTION	SEE VT04-01L01	SEE VT04-01L01	
<u>VT05-05</u>	GRAND ISLE	AGRICULTURAL RUNOFF	WATERSHED PLAN COMPLETED 1987	AG WASTE MGMT; CROPLAND EROSION CTRL; FIELD NUTRIENT MGMT	USDA-ACP; -SpP	40/87 W/SHED FARMS CONTRACTED ; 34/40 CONTRACTS INSTAL'D	-SpP AUTHOR'D ('88); NO \$\$ FY94

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VT05-07	JEWETT BROOK, 3.0 MILES	AGRICULTURAL RUNOFF	ST.ALBANS BAY SMALL W/SHED ASSESSMENT (1983); RCWP (1980-1990)	AG WASTE MGMT; CROPLAND EROSION CTRL; FIELD NUTRIENT MGMT	USDA-ACP	ON-GOING (ACP); RCWP DONE 1990; 16/21 FARMS CONTRACTED UNDER RCWP	
	MILL RIVER, FROM ST. ALBANS BAY TO 3 MILES UPSTREAM	AGRICULTURAL RUNOFF	ST.ALBANS BAY SMALL W/SHED ASSESSMT (1983); RCWP (1980-1990)	AG WASTE MGMT; CROPLAND EROSION CTRL; FIELD NUTRIENT MGMT	SEE JEWETT BROOK	SEE JEWETT BROOK; 16/21 W/SEHD FARMS CONTRACTED	
		STREAMBANK EROSION		REVEGETATE, RIPRAP WHERE NECESSARY	USAD-ACP	ON-GOING	ON-GOING; UNSCHEDULED COMPLETION DATES, DEPENDENT ON FED. & PRIVATE \$
	RUGG BROOK, APPROX. 0.5 MI BELOW INDUSTRIAL PK TO MOUTH	STREAMBANK EROSION		REVEGETATE, RIPRAP WHERE NECESSARY, EXCLUDE LIVESTOCK	USDA-ACP	ON-GOING	ON-GOING; UNSCHED. COMPLETION DATES, DEPENDENT ON FED. & PRIVATE \$\$
	RUGG BROOK, FROM MOUTH TO 2 MILES UPSTREAM	AGRICULTURAL RUNOFF	ST.ALBANS BAY SMALL W/SHED ASSESSMENT (1983); RCWP (1980-1990)	AG WASTE MGMT; CROPLAND EROSION CTRL; FIELD NUTRIENT MGMT	SEE JEWETT BROOK	SEE JEWETT BROOK; 6/15 W/SHED FARMS CONTRACTED	
	STEVENS BROOK - ST. ALBANS	HAZARDOUS WASTE SPILL W/ SURF WATER IMPACT			DEC-HMM; PETROL. CLEANUP FUND; RESPONSIBLE PARTIES	UNDER 10 VSA 1941 MGMT; PETROLEUM CONTAM'N FOUND AT BULK PLANT	SITE #911174
	STEVENS BROOK, 5.5 MILES DOWN TO MOUTH	AGRICULTURAL RUNOFF	ST.ALBANS BAY SMALL W/SHED ASSESSMENT (1983); RCWP (1980-1990)	SEE JEWETT BROOK	USDA-ACP	SEE ALSO JEWETT BRK; 9/20 W/SHED FARMS CONTRACTED	

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VT05-07	STEVENS BROOK, APPROX. 1 MILE BELOW CTRL VT RAIL YARD TO YARD	SEDIMENT, SOIL & WATER CONTAM'N FROM FUEL SPILLS & MGMT	BEGIN SITE INSPECTION 7/89		DEC-HMM; USEPA; VT ATTORN GEN; CERCLA	RI/FS UNDERWAY; STATE & FEDERAL LEGAL ACTION TAKEN; LMTD SOIL, SED, AQ TOX TEST.	SITE #770126
	STEVENS BROOK, AT MOUTH	HIGH PHOSPHORUS LOAD'G TO LAKE CHAMPLAIN; TOTAL P MASS LOAD = 3.7 MT/YR (#12)	DIAGN. MONITOR'G DONE	REDUCE NONPOINT SOURCE P LOADS; ST. ALBANS WWTF AWT NOW	EPA-SECT. 314-D/F	TOTAL P EXPORT = 0.65 KG/HA/YR (#5); DISS. P EXPORT = 0.35 (#6)	MODEL'G DONE SPR. '93; TARGET P REDUCT'N # LATE '93
	UNNAMED TRIB - ST. ALBANS TOWN	HAZARDOUS WASTE SPILL W/ SURF WATER IMPACT			DEC-HMM; PETROL. CLEANUP FUND; RESPONSIBLE PARTIES	UNDER 10 VSA 1941 MGMT; REMEDIATION STARTED	SITE #911019
VT05-07L01	ST. ALBANS BAY - LAKE CHAMPLAIN	NUISANCE ALGAE GROWTH; NUTRIENT ENRICHMENT; PATHOGENS	CONT'D MONITOR'G NEEDED; P RELEASE FROM BAY SEDIMENTS (1993 EVALUAT'N)	MAINTENANCE & CONT'D IMPL. OF AGRICUL. BMPs; WWTF P REMOVAL & 2NDARY TRTMT IN 89	USDA-ACP; RCWP ('80-'90); DEC-PF; DEC-ENF; LOCAL; DEC-WQ; LCBP	WWTF UPGRADE (1989); 65% W/SHED FARMS CONTRACTED (RCWP); SEE VT05-07 & 04-01L01	SEPTIC SURVEY OF SHORE BLDGS BY TOWN & DEC-ENF (1992)
		NUISANCE WEED GROWTH (INCLUDING EURASIAN MILFOIL)			US ACOE; VT ANCF & EWMCP; US EPA	NO HARVESTING 1989-1993; WEEVIL PRESENT	HERBIVORE RESEARCH PROJECT DONE 1995
VT05-08	STONE BRIDGE, AT MOUTH	PHOSPHORUS LOAD'G TO LAKE CHAMPLAIN; TOTAL P MASS LOAD = 1.3 MT/YR (#16)	DIAGN MONITOR'G DONE; TOTAL P EXPORT = 0.41 KG/HA/YR (#13); DISS P = 0.14 (#11)	REDUCE P FROM NONPT SOURCES IN W/SHED	EPA-SEC 314-D/F; SEC 319; USDA		TARGET RIVER MOUTH P REDUCT'N # 1994

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<u>VT05-09</u>	MALLETTS CREEK, AT MOUTH	PHOSPHORUS LOAD'G TO LAKE CHAMPLAIN; TOTAL P MASS LOAD = 2.7 MT/YR (#13)	DIAGN MONITOR'G DONE; TOTAL P EXPORT = 0.36 KG/HA/YR (#14); DISS P = 0.12 (#13)	REDUCE P FROM NONPT SOURCES IN W/SHED	EPA-SEC 314-D/F; SEC 319; USDA		TARGET RIVER MOUTH P REDUCTION # 1994
<u>VT05-09L01</u>	MALLETTS BAY - LAKE CHAMPLAIN	EURASIAN MILFOIL INFESTATION	EVALUATION OF APPROPRIATE CONTROL METHODS NEEDED	NONE IN USE CURRENTLY	US EPA; VT ANCF & EWMCP	LMTD HARVEST'G, BOTTOM BARRIERS, HAND PULL'G; WEEVIL PRESENT	HERBIVORE RESEARCH PROJECT DONE 1995
		LOW DISSOLVED OXYGEN CONCENTRATIONS DURING SUMMER IMPAIR FISHERY	PROBLEM NEEDS FURTHER ASSESSMENT		VT DF&W; UVM	UVM LIMNOLOGICAL ASSESSMENT /PROFILES	
		NUISANCE WEED AND ALGAE GROWTH (VARIOUS LOCATIONS ALONG SHORE) NUTRIENT ENRICH.	PROBLEM & SOURCES NEED FURTHER ASSESSMENT - LAKEWIDE SAMPLING & MODELING NEEDED		SEE VT04-01L01	SEE VT04-01L01	
		PERIODIC BACTERIA VIOLATIONS AT FOUR PUBLIC BEACHES, INNER BAY SECTION	ASSESSMENT ON-GOING		VT-DOH; LOCALS	BACTERIOLOGICAL SAMPL'G DONE; RESULTS PENDING LOCAL ACTION	
<u>VT05-09L03</u>	COLCHESTER POND	NUTRIENT ENRICHMENT, NUISANCE ALGAL GROWTH			VT DEC LAKES & PONDS; LAKE ASSOC.	LOCAL ASSESSMENT ON-GOING	
VT05-10	** BURLINGTON DIRECT TO LAKE, BURLINGTON	GRD WATER CONTAMINATED BEYOND DRINK'G WATER STRDRS; NOT SUITABLE AS A SOURCE	ASSESSMENT COMPLETED; PINE STREET BARGE CANAL AREA	CONTIN'D MONITORING; RE-ASSESS CLASSIFICATION CA. 1998	CERCLA; DEC-WS	CLASS 4 GROUNDWATER	

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VT05-10	ENGLESBY RAVINE	STORMWATER RUNOFF, PATHOGENS, BLANCHARD BEACH CLOSURES	CAUSES & SOURCES NEED TO BE IDENTIFIED	BURLINGTON CSO PROJECT SHOULD HAVE CORRECTED	BURLINGTON CITY; UVM; DEC-WQ; DEC-PROT; SECT 319	2 YR STUDY UNDERWAY INCLUDES MODELING EFFORT (UVM)	
VT05-10L01	BURLINGTON BAY - LAKE CHAMPLAIN	NUISANCE WEED AND ALGAE GROWTH, TURBIDITY, NUTRIENT ENRICHMENT	PROBLEM & SOURCES NEED FURTHER ASSESSMENT, LAKEWIDE SAMPLING AND MODELING NEEDED		SEE VT04-01L01	SEE VT04-01L01	
	BURLINGTON BAY - OAKLEDGE PARK	BLANCHARD BEACH CLOSURES; PATHOGENS	SOURCES NEED TO BE IDENTIFIED		BURLINGTON CITY; UVM; DEC-WQ; SECT 319 (POSSIBLE)		
	BURLINGTON BAY - PINE STREET BARGE CANAL	CONTAMINATION FROM COAL TAR IN SEDIMENTS OF PINE STREET BARGE CANAL	ASSESS EXTENT OF CONTAMINATION, METHOD OF CLEAN-UP	ALSO SITE #770039 & 770041	US EPA SUPERFUND SITE; DEC-HMM	FINAL RI ISSUED 4/92; DRAFT FS BY 5/92; FINAL FS 6/92; SITE #770042	EPA RI/FS DONE BY FALL '92; ROD BY EARLY 1993
VT05-10L02	MAIN LAKE - LAKE CHAMPLAIN	EURASIAN MILFOIL INFESTATION IN SOME AREAS	EVALUATION OF ADDITIONAL MILFOIL CONTROL OPTIONS	NONE CURRENTLY IN USE	ANCF & EMCP - MORE FUNDING NEEDED TO EVALUATE/IMPLEMENT BEST CONTROL METHODS	WEEVIL PRESENT	HERBIVORE RESEARCH PROJECT DONE 1995
		NUISANCE WEED AND ALGAE GROWTH IN SOME AREAS, NUTRIENT ENRICHMENT	PROBLEM AND SOURCES NEED FURTHER ASESSMENT, LAKEWIDE SAMPLING & MODELING NEEDED		SEE VT04-01L01	SEE ALSO VT05-04L02; 05-07; 05-11	

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VT05-11	LAPLATTE RIVER FROM HINESBURG TO MOUTH (10.5 MILES)	AGRICULTURAL RUNOFF	SHELBURNE BAY SMALL W/SHED ASSESSMT (1983); PL83-566 (1979-1989)	AG WASTE MGMT; CROPLAND EROSION CTRL; FIELD NUTRIENT MGMT	USDA-ACP; DEC-WQ	27/70 W/SHED FARMS CONTRACTED (PL-566); -ACP ON-GOING	ON-GOING BIOL. MONITORING
		SOIL EROSION FROM LAND DEVELOPMENT	SOURCES/AMOUNTS NEED ASSESSMENT; RARE FISH SPECIES PRESENT		DEC-ENF; ACT 250; LOCAL	FISH POPULATION MONITOR. UNDERWAY	
	LAPLATTE RIVER, AT MOUTH	HIGH PHOSPHORUS LOAD'G TO LAKE CHAMPLAIN; TOTAL P MASS LOAD = 15.2 MT/YR (#8)	DIAGN MONITOR'G DONE; TOTAL P EXPORT = 1.11 KG/HA/YR (#3); DISS P = 0.81 (#1)	REDUCE P FROM NONPT SOURCES IN W/SHED	EPA-SEC 314-D/F; SEC 319; TMDL MINI-GRANT; P ALLOCATION STRATEGY; DEC-WQ	SHELBURNE WWTF AWT NOW; HINESBURG WWTF AWT IN OPERATION L DEVELOPME T	TARGET RIVER MOUTH P REDUCTION # 1994
	MCCABES BROOK, UPSTREAM FROM MOUTH FOR 3.5 MILES	AGRICULTURAL RUNOFF	SHELBURNE BAY SMALL W/SHED ASSESSMENT (1983); PL83-566 (1979-1989)	AG WASTE MGMT; CROPLAND EROSION CTRL; FIELD NUTRIENT MGMT	USDA-ACP	SEE LAPLATTE RIVER	
		SOIL EROSION FROM LAND DEVELOPMENT			ACT 250; LOCAL; DEC-ENF		
MUD HOLLOW BROOK, FROM MOUTH TO 3 MILES UPSTREAM	AGRICULTURAL RUNOFF	SHELBURNE BAY SMALL W/SHED ASSESSMT (1983); PL83-566 (1979-1989)	AG WASTE MGMT; CROPLAND EROSION CTRL; FIELD NUTRIENT MGMT	USDA-ACP	SEE LAPLATTE RIVER		
	STREAMBANK EROSION	SHELBURNE BAY SMALL WATERSHED ASSESSMENT 1983	RIPRAP, REVEGETATE, EXCLUDE LIVESTOCK	SEE ABOVE	SEE ABOVE		
POTASH BROOK, FROM MOUTH TO 5 MILES UPSTREAM	CONSTRUCTION EROSION-S.CONNECTOR NEAR RT.7; LOSS STREAM HABITAT-CHANNEL RELOC'N		STABILIZE SITE, REVEGETATE, MULCH, INSTALL SILT FENCES	PROJECT IS UNDER ACT 250 JURISDICTION; VT AOT SUPERVISED	ON-GOING BIOL.MONIT ORING (VT DEC/WQ)		

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<u>VT05-11</u>	POTASH BROOK, FROM MOUTH TO 5 MILES UPSTREAM	URBAN RUNOFF	NEEDS ASSESSMENT		BURLINGTON & SO. BURL; DEC-WQ; SECT 319 (POSSIBLE)		
<u>VT05-11L01</u>	SHELBURNE BAY - LAKE CHAMPLAIN	BACTERIA VIOLATIONS - RED ROCKS BEACH	SOURCE NEEDS ASSESSMENT		BURLINGTON CITY	CSO WORK COMPLETED; PART OF PROBLEM; SEE ENGLSBY RAVINE VT05-10 & 05-10L01	
		EURASIAN MILFOIL INFESTATION	HERBIVORE RESEARCH PROJECT; EVAL OF MILFOIL CTRL OPTIONS	NONE IN USE CURRENTLY	US EPA; VT ANCF & EWMCP; MORE \$\$ NEEDED TO EVAL/IMPL BEST CTRL METHODS	LMTD HARVEST'G, BOTTOM BARRIERS, HAND PULL'G; WEEVIL PRESENT	HERBIVORE RESEARCH PROJECT DONE 1995
		NUISANCE WEED & ALGAE GROWTH IN LIMITED AREAS, NUTRIENT ENRICHMENT	PROBLEM & SOURCES NEED FURTHER ASSESSMENT, LAKEWIDE SAMPLING & MODELING NEEDED		SEE VT04-01L01	SEE VT04-01L01	
<u>VT05-11L02</u>	LAKE IROQUOIS (HINESBURG)	NUISANCE ALGAL & NATIVE WEED GROWTH, NUTRIENT ENRICHMENT	EXTENSIVE DIAGN/FEASIB STUDY DONE	REFER TO W/SHED RESTORATION/MGMT PROGRAM PLAN	DEC-WQ; LAKE ASSOC; SECTION 319; LOCAL COMM'TEE	FY91 319 \$\$ SECURED W/ BMP GRANTS TO LANDOWNERS SINCE 1979 ; PARTICIPATION BY TOWNS	319 DEMON PROJECT COMPLETE (4/92-10/93); ADV LAY MONITORING SINCE 1979
	LAKE IROQUOIS (HINESBURG); SURFACE AREA = 229ac	MODERATE EURASIAN WATERMILFOIL INFEST'N; INFEST'N SINCE 1990	ANNUAL SHORELINE INSPECTIONS		VT EURASIAN MILFOIL CTRL PRGM, LOCAL EFFORTS	WEEVIL PRESENT; HANDPULLING USED	

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VT05-11L03	LOWER LAKE (HINESBURG)	NUISANCE NATIVE WEED GROWTH, ALGAE BLOOMS, PATHOGENS, NUTRIENT ENRICHMENT	FURTHER ASSESSMENT OF PROBLEMS AND POSSIBLE RESTORATION ACTIVITIES NEEDED.				
	LOWER LAKE (HINESBURG); SURFACE AREA = 61ac	MODERATE EURASIAN WATERMILFOIL INFEST'N; INFEST'N SINCE 1987	HERBIV. RESERACH PROJECT; EVAL OF MILFOIL CTRL OPTIONS	NONE CURRENTLY IN USE ('93); TRIED HANDPULLING	US EPA; VT ANCF & EMMCP; MORE \$\$ NEEDED TO EVAL/IMPL BEST CTRL METHODS	ON-GOING; WEEVIL PRESENT	HERBIV. RES. PROJECT DONE 1995
VT06-01	LOWER MISSISQUOI RIVER, LAKE TO EAST BERKSHIRE	AGRICULTURAL RUNOFF	PRELIMINARY ASSESSMENT IN 1984	AG WASTE MGMT; CROPLAND EROSION CTRL; FIELD NUTRIENT MGMT	USDA-ACP; - WQIP; -HUA; SP-53 AREA	USDA SP PROJECT; \$900K FY92; NO \$\$ FY94; 112/342 W/SHED FARMS CNT'D; 40/112 DONE	USDA-HUA AUTHOR'D 1989
		EXCESSIVE STRMBNK EROSION; IMPACT TO BURIAL GRD (SWANTON/HIGHGATE)	NEEDS ASSESSMT & QUANTIFIC'N; BURIAL SITE APPROX. 250' LONG, EROSION 2 FT/YR	RIPRAP, REVEGETATION, BUFFER STRIP MGMT	USDA-ACP; - HUA; VT DHP; TNC; ABENAKI	REVEG. INEFFECT. & 2 ENDANG. SP. PRESENT (BURIAL SITE)	
	LOWER MISSISQUOI RIVER, TWO-TENTHS MILE BELOW HIGHGATE FALLS DAM	FLOW REGULATION IN BYPASS IMPAIRS AESTHETICS; BYPASS IS WATERFALL AND CASCADE	AESTHETICS STUDY NEEDED	INCREASED SPILLAGE OVER DAM	LICENSED 1984, CERTIFIED 1983. AMEND PERMITS	PHASE 1 OF CONSTRUCTION COMPLETE	
	MISSISQUOI RIVER, AT MOUTH	HIGH PHOSPHORUS LOAD'G TO LAKE CHAMPLAIN; TOTAL P MASS LOAD = 131.2 MT/YR (#2)	DIAGN. MONITOR'G DONE	REDUCE P FROM PT & NONPT SOURCES; SWANTON WWTF AWT NOW; ENOSBURG TO BE AWT	EPA-SECT.314-D/F	TOTAL P EXPORT = 0.59 KG/HA/YR (#6); DISS. P EXPORT = 0.14 (#10)	TARGET RIVER MOUTH P REDUCT'N # 1994

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VT06-02	MISSISQUOI RIVER - RICHFORD	HAZARDOUS WASTE SPILL W/ SURF WATER IMPACT			DEC-HMM; PETROL. CLEANUP FUND; RESPONSIBLE PARTIES	UNDER 10 VSA 1941 MGMT; SITE CLEANUP; INVEST'N PROCEED.; SITE IN ENFORCEMENT	SITE #911179
		NPS CONTRIBUTIONS FROM QUEBEC	ASSESSMENT NEEDED		VT/QUE MOU SIGNED		UNSCHEDULED QUE JURISDICTION
	MISSISQUOI RIVER BELOW ENOSBURG WASTEWATER TREATMENT FACILITY	ENOSBURG WWTF & COLL'N SYSTEM PASS COMBINED SEWER OVERFLOWS	PRELIM. ASSESSM'T DONE TO SEPARATE STORM FROM SANITARY LINES	CSO ABATEMENT	DEC-PF; SRF; STATE CONSTR. GRANTS PRGM	FINAL DESIGN DONE	CONSTRUCTION CY95; TOWN VOTE (3/94) NO
VT06-03	KELLEY BROOK	YOUNG LANDFILL RECV'D HAZARDOUS WASTE; EVIDENCE OF LEACHATE ENTERING SURF WATER	WAS HI-THREAT IN '89; STATE THREAT'D FISH SPECIES PRESENT; NEEDS FURTHER ASS'MT		CERCLA; DEC-SW; DEC-WQ	DEC & EPA WATER & SEDIMENT SAMPLING 1989; FINAL LSI RECV'D 6/90	SITE #770011; DISCONT'D RECEV'G WASTE 1985
VT06-05L01	METCALF POND (FLETCHER); SURFACE AREA = 71ac	LIGHT EURASIAN MILFOIL INFEST'N; SINCE 1984	HERBIV. RES. PROJECT; EVAL OF MILFOIL CTRL OPTIONS; CONSIDER RARE AQ. PLT SPEC.	HANDPULLING USED IN PAST	US EPA; VT ANCF & EWMCP; MORE \$\$ NEEDED TO EVAL/IMPL BEST CTRL METHODS	MILFOIL POPULATION DRAMATICALLY REDUCED; REASON(S) UNKN., ASSESSMENT ON-GOING	HERBIV. RES. PROJECT DONE 1995
VT06-05L03	FAIRFIELD POND (FAIRFIELD)	EXCESSIVE ALGAL GROWTH, NUTRIENT ENRICHMENT, D.O. DEPLETION	DIAGNOSTIC STUDY DONE 1991	WATERSHED RESTORATION RECOMMENDED AS FIRST STEP	DEC-WQ; USDA-HUA FOR W/SHED; LAKE ASSOC.	ADV. LAY MONITORING SINCE 1980	WATERSHED INVENTORY DELAYED
	FAIRFIELD POND (FAIRFIELD); SURFACE AREA = 464ac	LIGHT EURASIAN WATERMILFOIL INFEST'N; INFEST'N SINCE 1993	ANNUAL SHORELINE INSPECTIONS FOR NEW INFESTATIONS	BOTTOM SCREENING AND HAND PULLING IF SUFFICIENT TO PREVENT SPREAD	MILFOIL WATCHERS PROGRAM, SUMMER LAKES AND PONDS CREW SURVEYS	HANDPULLING USED	

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VT06-07	TROUT RIVER	ST. ONGE LANDFILL; EVIDENCE OF LEACHATE ENTERING SURFACE WATER	WAS HI-THREAT IN '89; SITE INSPECT'N & BIO-SURVEY NEEDED		CERCLA; DEC-SW; DEC-WQ	NO IMMEDIATE ASSESSMENT PLANS; NEED FUNDS FOR STAFF & PRIORITY POLLUTANT TESTS	SITE CLOSED; GRD & SURF WATER SAMPL'G IN CLOSURE PLAN
	TROUT RIVER, FROM MOUTH TO 3.5 MILES UPSTREAM	AGRICULTURAL RUNOFF	PRELIMINARY INVESTIGATION (1984)	AG WASTE MGMT; CROPLAND EROSION CTRL; FIELD NUTRIENT MGMT	USDA-HUA	\$3.5m FOR 3 YEARS SINCE 1989	SEE VT06-01
		STREAMBANK EROSION		RIPRAP, REVEGETATE, BUFFER STRIP MGMT	USDA-ACP;-HUA	SEE ABOVE	ON-GOING; UNSCHED. COMPLETION DATES, DEPENDENT ON FED. & PRIVATE \$\$
VT06-08	COBOURN BROOK, 0.1 MILE BELOW CHEESE PLANT DISCHARGE	AGRICULTURAL RUNOFF		AG WASTE MGMT; EROSION CTRL; FIELD NUTRIENT MGMT; LIVESTOCK & BUFFER STRIP MGMT	USDA-ACP	ACP ADMINISTERED BY COUNTY	
	UPPER MISSISQUOI RIVER, 4 MILES BELOW BAKERS FALLS DAM	FLOW REGULATION	FLOW STUDY NEEDED	IMPROVE FLOW REGIME	DEC-WQ; SECT. 1003 CONFERENCE; CITIZENS UTIL	UNLICEN. STATUS UNDER FERC REVIEW; DECISION AS TO SECTION 401 SCOPE PENDING	WASTE GATE REPAIR PROJECT MAY TRIGGER 401 CERTIFICATION
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	ASSESS PROBLEM	MEASURES TO PREVENT IMPINGEMENT & ENTRAINMENT & ALLOW PASSAGE	DEC-WQ; VT DF&W	UNLICENSED STATUS UNDER FERC REVIEW	
	UPPER MISSISQUOI RIVER, IMPOUNDMENT OF BAKERS FALLS HYDRO	WATER LEVEL FLUCT'N BY HYDRO IMPAIRS FISHERY	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT	REDUCE DRAWDOWN MAGNITUDE	10 VSA SECTION 1003 CONF.; ANR-DF&W, DEC-WQ	UNLICENSED HYDRO STATUS UNDER FERC REVIEW	DAM WASTE GATE REPAIR MAY TRIGGER 401

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VT07-01	LAMOILLE RIVER, AT MOUTH	PHOSPHORUS LOAD'G TO LAKE CHAMPLAIN; TOTAL P MASS LOAD = 52.2 MT/YR (#5)	DIAGN MONITOR'G DONE; TOTAL P EXPORT = 0.27 KG/HA/YR (#15); DISS P = 0.08 (#15)	REDUCE P FROM PT & NONPOINT SOURCES	EPA-SECT.314-D/F	FAIRFAX & JEFF'VILLE WWTFs NO P REMOVAL PLANNED; MILTON WWTF NO AWT BUT ENLARGE	JOHNSON WWTF PRELIM CONSTR 1994; MO'VILLE WWTF 1995
	LOWER LAMOILLE RIVER - MILTON	EVIDENCE OF MILTON LANDFILL LEACHATE ENTERING SURFACE WATER			DEC-SW	DISCONT'D RECV'G WASTE 10/86	
	LOWER LAMOILLE RIVER FROM CLARKS FALLS DAM TO LAKE CHAMPLAIN	AGRICULTURAL RUNOFF	PRELIMINARY INVESTIGATION 1986	AG WASTE MGMT; CROPLAND EROSION CTRL; FIELD NUTRIENT MGMT	USDA-ACP; - SpP; PL83-566 (BELOW JOHNSON)	13/143 W/SHED FARMS CONTRACTED ; 3/13 CONTRACTS INSTAL'D	SP PROJECT AUTHOR'D ('92) W/ \$400K; NO \$\$ FY94
		CLARKS FALLS, MILTON FALLS, AND PETERSON DAMS CREATE POOR FLOW REGIME	FLOW STUDY NEEDED BELOW PETERSON & MILTON BYPASSES	IMPROVE FLOW REGIME	FERC LICENSING & W.Q.CERTIFICATI ON	WNVIRON. ASSESSM'T BEING PREPARED; CVPS MUST RE-APPLY FOR 401 CERTIFICAT E	FERC RELICENSING IMMINENT
		CLARKS FALLS, MILTON FALLS, AND PETERSON DAMS MAY IMPEDE FISH PASSAGE	NEEDS ASSESSMENT	MEASURES TO PREVENT IMPINGEMENT AND ENTRAINMENT AND ALLOW PASSAGE OF FISH		ANR FILED COMMENTS W/ FERC FOR RELICENSING	
	MILTON DAM RESULTS IN DEWATERING OF A LARGE CASCADE IN BYPASS	AESTHETICS STUDY NEEDED	IMPROVED FLOW REGIME		ISSUE BEING CONSIDERED IN RELICENSING PROCESS		

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VT07-01	LOWER LAMOILLE RIVER FROM CLARKS FALLS DAM TO LAKE CHAMPLAIN	POSSIBLE FAILED SEPTIC SYSTEMS	NEEDS ASSESSMENT		DEC-ENF; SECTION 319	IDENTIFIED PAST PROBLEMS CORRECTED	PRESENT PROBLEMS CONSIDERED VERY ISOLATED; SURVEY WORK UNSCHEDULED
		RIVERBANK EROSION	PRELIMIN. INVESTIG. (1986); SEGMENT USED BY SEVERAL ENDAN & THREAT SPECIES		USDA-ACP	ON-GOING	ON-GOING; UNSCHED. COMPLETION DATES, DEPENDENT ON FED. & PRIVATE \$\$
	LOWER LAMOILLE RIVER, IMPOUNDMENTS OF CLARKS FALLS & PETERSON HYDROS	WATER LEVEL FLUCT'N BY HYDROS IMAPIRS AQ. BIOTA/VEG., AESTHETICS & RECREATION	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT	REDUCE DRAWDOWN MAGNITUDE	FERC LICENSING & W.Q. CERTIFICATION	LICENSE EXPIRED 12/87; AT PRESENT - UNLICENSED & UNCERTIFIED	CVPS MUST RE-APPLY FOR 401 CERTIFICATION
VT07-02	LOWER MIDDLE LAMOILLE FROM FAIRFAX FALLS DAM TO ARROWHEAD MT LAKE	AGRICULTURAL RUNOFF	PRELIMINARY INVESTIGATION 1986	AG WASTE MGMT; CROPLAND EROSION CTRL; FIELD NUTRIENT MGMT	USDA-ACP; PL83-566 (BELOW JOHNSON)	USDA SPECIAL PROJECT APPROVED (1992)	SEE ALSO VT07-01
		DEWATERING OF LARGE WATERFALL IN BYPASS OF FAIRFAX FALLS DAM	AESTHETICS STUDY NEEDED FOR WATERFALL	IMPROVED FLOW REGIME	FERC LICENSING & W.Q. CERTIFICATION	AESTHETICS STUDY DONE	CVPS MUST RE-APPLY FOR 401 CERTIFICATE
		FLOW REGULATION BELOW FAIRFAX FALLS HYDRO DAM	WATER QUALITY STUDIES COMPLETED	IMPROVE FLOW REGIME	DEC-WQ	ACCEPTABLE PROPOSAL BY CVPS INCORP. INTO LICENSE; CVPS MUST RE-APPLY FOR 401	ON-GOING BIOL. MONITORING

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VT07-02	LOWER MIDDLE LAMOILLE FROM FAIRFAX FALLS DAM TO ARROWHEAD MT LAKE	POSSIBLE FAILED SEPTIC SYSTEMS	NEEDS ASSESSMENT		DEC-ENF; SECTION 319	PAST PROBLEMS CORRECTED	PRESENT PROBLEMS CONSIDERED VERY ISOLATED; SURVEY WORK UNSCHEDULED
		POSSIBLE FISH PASSAGE PROBLEM AT FAIRFAX FALLS DAM	FISH PASSAGE ISSUE ADDRESSED	MEASURES TO PREVENT IMPINGEMENT AND ENTRAINMENT AND ALLOW FOR PASSAGE		ANR FILED COMMENTS W/ FERC FOR RE-LICENSING	
VT07-03L04	ARROWHEAD MTN LAKE (MILTON)	SILTATION, ORGANIC ENRICHMENT	PART OF LAKE CHAMPLAIN PHOS. STUDY		LAKE CHAMPLAIN MGMT CONFERENCE		
	ARROWHEAD MTN LAKE (MILTON); SURFACE AREA = 732 ac	MODERATE EURASIAN WATERMILFOIL INFEST'N; INFEST'N SINCE 1988	HERBIV. RES. PROJECT; EVAL OF MILFOIL CTRL OPTIONS		ANCF & EMCP, MILFOIL WATCHERS PROGRAM, SUMMER LAKES & PONDS CREW SURVEY	NO CONTROLS AT PRESENT; WEEVIL FOUND IN LAKE	HERBIVORE RESEARCH PROJECT DONE 1995
VT07-04	MID-LAMOILLE RIVER, IMMED. BELOW CADYS FALLS DAM	DEWATERING OF FALLS	AESTHETICS STUDY NEEDED	IMPROVED FLOW REGIME	FERC LICENSING & W.Q.CERTIFICATI ON	LICENSED & CERTIFIED	LICENSE EXPIRES 8/15/2015
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	NEEDS ASSESSMENT	MEASURES TO PREVENT IMPINGEMENT & ENTRAINMENT & ALLOW PASSAGE	FERC LICENSING & W.Q.CERTIFICATI ON	LICENSED & CERTIFIED	
VT07-07	LAMOILLE RIVER - NEAR WILD BRANCH	AGRICULTURAL WASTE STORAGE & APPL'N; STREMBANK EROSION	NEEDS ASSESSMENT	IMPROVED AG WASTE MGMT; RIPRAP; REVEGETATE; BUFFER STRIP MGMT	USDA-ACP; DEC-ENF; VT DAF&M (AAPs)		
	LAMOILLE RIVER FROM HARDWICK LAKE TO LAKE LAMOILLE IN MORRISVILLE	AGRICULTURAL RUNOFF	NEEDS ASSESSMENT		USDA-ACP; DEC-WQ	ON-GOING (ACP); ON-GOING BIOL. MONITORING	

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VT07-07	LAMOILLE RIVER FROM HARDWICK LAKE TO LAKE LAMOILLE IN MORRISVILLE	HARDWICK LAKE DAM: FLOW REGIME DOWNRIVER	FISHERIES FLOW NEEDS ASSESSMENT BEGUN	IMPROVED FLOW REGIME	10 VSA SECTION 1003 CONFERENCE	UNLICENSED STATUS UNDER FERC REVIEW	
		MORRISVILLE DAM DOWNSTREAM: NO FLOW IN BYPASS IMPAIRS AESTHETICS AND RECREATION	LOW FLOW STUDY FOR AESTHETICS NEEDED	IMPROVE FLOW REGIME	FERC LICENSING & W.Q.CERTIFICATION	LICENSED & CERTIFIED	LICENSE EXPIRES 8/15/2015
		NATURAL STREAMBANK EROSION	RC & D SPONSORED EROSION INVENTORY 1985	RIP-RAP; REVEGETATE WHERE NECESSARY	USDA-ACP; RC&D	ACP ADMINISTERED BY COUNTY	
		POSSIBLE FISH PASSAGE PROBLEM AT DAMS	ASSESS PROBLEM	MEASURES TO PREVENT IMPINGEMENT & ENTRAINMENT & ALLOW PASSAGE	FERC LICENSING & W.Q.CERTIFICATION		
		WOLCOTT DAM: POOR FLOW REGIME DOWNSTREAM	FISHERIES FLOW NEEDS ASSESSMENT COMPLETE	IMPROVE FLOW REGIME			UNLICENSED STATUS UNDER FERC REVIEW
		WOLCOTT DAM: POSSIBLE FISH PASSAGE PROBLEM AT DAM	ASSESSMENT NEEDED	MEASURES TO PREVENT IMPINGEMENT & ENTRAINMENT & ALLOW PASSAGE	DEC-WQ; VT DF&W		UNLICENSED STATUS UNDER FERC REVIEW
		WOLCOTT DAM: WATER LEVEL FLUCT'N BY HYDRO IMPAIRS FISHERY & CAUSES EROSION	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT	REDUCE DRAWDOWN MAGNITUDE	10 VSA SECTION 1003 CONF.; ANR-DF&W, DEC-WQ		UNLICENSED HYDRO STATUS UNDER FERC REVIEW
VT07-07L01	LAKE LAMOILLE (MORRISTOWN)	EXCESS ALGAE, NUTRIENT ENRICHMENT	PROBLEMS & SOURCES NEED FURTHER ASSESSMENT				
		WATER LEVEL FLUCTUATION, SEDIMENTATION	PROBLEMS AND POSSIBLE SOURCES NEED FURTHER ASSESSMENT.		W.Q.CERTIFICATION FOR WATER LEVEL FLUCTUATION		

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VT07-08	ELMORE POND BROOK-FROM DAM TO 2 MILES DOWNSTREAM	FLOW REGULATION	FLOW STUDY NEEDED	IMPROVE FLOW REGIME	FERC LICENSING & W.Q.CERTIFICATION	PENDING	DAM LICENSE EXPIRES 8/15/2015
	RODMAN BROOK - MORRISTOWN	EVIDENCE OF LAMOILLE LANDFILL LEACHATE ENTERING SURFACE WATER			DEC-SW	DEC PA COMPLETED 10/88; DISCONT'D RECEV'G WASTE 9/92	SITE #770058
VT07-08L02	LAKE ELMORE (ELMORE)	SEDIMENTATION, NUISANCE WEED GROWTH, NUTRIENT ENRICHMENT, ODORS	ASSESSMENT OF NUTRIENT & OTHER POLLUTION SOURCES NEEDED		DEC-WQ	ADV. LAY MONITORING 1979 TO 1985; BASIC MONITORING '86 TO '88	
		WATER LEVEL FLUCT'N BY HYDRO IMPAIRS FISHERY IN LAKE	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT	REDUCE DRAWDOWN MAGNITUDE	FERC LICENSING & W.Q. CERTIFICATION	FERC LICENSE ISSUED IN 1981	
VT07-10,11	UPPER BROWNS RIVER AND LEE RIVER	GRAVEL MINING VIOLATIONS	CONSIDER PRESENCE OF STATE THREATENED PLANT SPECIES (UPPER BROWNS)		DEC-WQ; DEC-PROTECTION; DEC-ENF	VIOLATIONS ON-GOING BIOL. MONITORING REFERRED TO ATTORNEY GENERAL'S OFFICE FOR PROSECUTION	
VT07-11	CRANE BROOK - UNDERHILL	EVIDENCE OF UNDERHILL LANDFILL LEACHATE ENTERING SURFACE WATER			DEC-SW	DISCONT'D RECEV'G WASTE 11/92	
VT07-13L02	LAKE OF THE CLOUDS	CRITICALLY ACIDIFIED		REDUCE EMISSIONS FROM OUT OF STATE SOURCES	DEC-WQ; ACID PRECIP. MONITOR'G	1990 AMENDMENTS CLEAN AIR ACT; SO2 & NOX EMISSIONS REDUCT'N	REDUCT'N OVER NEXT 10 -12 YRS

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VT07-15	GIHON RIVER - JOHNSON	EVIDENCE OF JOHNSON LANDFILL LEACHATE ENTERING SURFACE WATER			DEC-SW	DISCONT'D REC'G WASTE 12/92	
	UNNAMED TRIB OF GIHON RIVER, BELOW SOUTH POND DAM	FLOW REGULATION	FLOW STUDY NEEDED	IMPROVE FLOW REGIME	10 VSA SECTION 1003 CONFERENCE	UNLICENSED STATUS UNDER FERC REVIEW	
VT07-15L05	SOUTH POND	WATER LEVEL FLUCT'N BY HYDRO IMPAIRS FISHERY IN POND	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT	REDUCE DRAWDOWN MAGNITUDE	10 VSA SECTION 1003 CONF. ; ANR-DF&W, DEC-WQ	UNLICENSED HYDRO STATUS UNDER FERC REVIEW	
VT07-16	KENFIELD BROOK - MORRISTOWN	HAZARDOUS WASTE SPILL W/ SURF WATER IMPACT			PETROLEUM CLEANUP FUND & RESPONSIBLE PARTIES	UNDER 10 VSA 1941 MGMT	SITE #911100
VT07-21	NICHOLS BROOK IN WOODBURY BELOW DAMS ON EAST LONG POND & NICHOLS POND	FLOW REGULATION	FLOW STUDY NEEDED	IMPROVE FLOW REGIME	10 VSA SECTION 1003 CONFERENCE	UNLICENSED STATUS UNDER FERC REVIEW	
VT07-21L01	EAST LONG POND	WATER LEVEL FLUCTUATION BY HYDRO IMPAIRS FISHERY & ENDANGERED SPECIES	FURTHER ASSESSMENT OF FISHERY/WILDLIFE HABITAT REQUIREMENT IN POND	REDUCE DRAWDOWN MAGNITUDE	10 VSA SECTION 1003 CONF. ; ANR-DF&W, DEC-WQ	UNLICENSED STATUS UNDER FERC REVIEW	
VT07-21L05	HARDWICK LAKE	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
		WATER LEVEL FLUCT'N BY HYDRO IMPAIRS LAKE'S FISHERY & WETLANDS, CAUSES EROSION	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT, WETLANDS & EROSION IMPACTS	REDUCE DRAWDOWN MAGNITUDE	10 VSA SECTION 1003 CONF. ; ANR-DF&W, DEC-WQ	UNLICENSED HYDRO STATUS UNDER FERC REVIEW	

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<u>VT07-22L03</u>	HORSE POND	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
<u>VT07-22L04</u>	LONG POND - GREENSBORO	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
VT08-01	**LOWER WINOOSKI RIVER, NEAR ESSEX JUNCTION & IBM FACILITY	HAZARDOUS WASTE RELEASES TO GRD WATER; DISCHARGE TO SURFACE WATER	RELEASES FROM 14/22 SWMUs; VOCs; SEMI-VOCs; PCE; TCE; DCE; XYLENE; VINYL CL	EXTRACT'N TRENCH; C ADSORP'N; OZONA'N; GRD WATER COLL'N; VACUUM EXTRACT'N	US EPA; RCRA (CAP; RFI; CMS; RISK ASSESSM'T); DEC-BMM	CAP (1986); FINAL RFI & CMS (12/91); MTG/HEARIN G (9/92)	
	LOWER WINOOSKI RIVER	AGRICULTURAL RUNOFF	AG. SMALL WATERSHED PROJECT 1983; WATERSHED PLAN 1985; RE-ASSESSMENT 10/88	AG WASTE MGMT; CROPLAND EROSION CTRL; FIELD NUTRIENT MGMT	USDA-ACP; FL83-566 (BELOW BOLTON)	566 (8/77); 9/77 W/SHED FARMS CONTRACTED ; 5/9 CRTS DONE; 23/77 FARMS SOLD OUT	ESTIMATED FL83-566 COMPLETION 1993; ACP ON-GOING
		POOR DISSOLVED OXYGEN CONCENTRATIONS BELOW HYDRO DAMS		7Q10 SPILLAGE OVER DAMS	DEC-WQ; WASTELOAD ALLOCATION PROCESS	LICENSE APPL'N FOR ESSEX 19 SUBMITTED 12/91	
		POOR FLOW REGIME BELOW ESSEX 19 & GORGE 18 DAMS	FISHERIES FLOW NEEDS ASSESSMENT (COMPLETE); CONSIDER STATE THREAT. FISH SPECIES	IMPROVE FLOW REGIME	#18-UNLICENSED-10 VSA SEC.1003 CONF.; #19-FERC LICENSE & W.Q.CERTIF.	LIC.PREP.B EGAN-1988; W.Q.C 12/91; EASTERN ERTIF.REVI SAND DARTER SED; PROBLE MONITOR. START MS AT #18 1993 & #19-RESOLVED SIMUL.	
		POSSIBLE FISH PASSAGE PROBLEM AT HYDRO DAMS	ESSEX 19 IFIM DONE; DUAL FLOW ANALYSIS NOT DONE	MEASURES TO PREVENT IMPINGEMENT AND ENTRAINMENT AND ALLOW FOR PASSAGE	FERC LICENSING & W.Q.CERTIFICATI ON; 10 VSA SEC.10003 CONF.	BYPASS DEMONSTRAT ION TO BE DONE	ESSEX 19 LICENSE EXPIRES 1993; APPL'N FILED BY GMP 12/91

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VT08-01	<u>LOWER WINOOSKI RIVER</u>	SOIL EROSION FROM CONSTRUCTION SITES			DEC-ENF; ACT 250; LOCAL	ON-GOING ENFORCEMENT ACTIONS FOR EROSION CONTROL; NEED ADD'L INVESTIGATIONS	
		STORMWATER RUNOFF, HIGHWAY RUNOFF FROM URBAN AREAS	NEEDS ASSESSMENT		DEC-WQ; DEC-PROT; VT AOT; BURLINGTON & SO. BURL; SECT 319 (POSSIBLE)		TOXICS ASSESSMENT FOR VT08-01 PLANNED 1989/90
		STREAMBANK EROSION	SMALL WATERSHED ASSESSMENT 1983; WATERSHED PLAN 1985	RIP-RAP; REVEGETATE WHERE NECESSARY	USDA-ACP; DEC-AF	ON-GOING (ACP); DEC BANK STABILIZATION PROJECT	ON-GOING; UNSCHED. COMPLETION DATES, DEPENDENT ON FED. & PRIVATE \$\$
		WINOOSKI WASTEWATER COLL'N SYSTEM MAY PASS COMBINED SEWER OVERFLOWS	CITY ASSESSING IMPACT	CSO ABATEMENT	DEC-PF; SRF; STATE CONSTR. GRANTS PRGM	PRELIM ASSESSM'T	
	<u>WINOOSKI RIVER, AT MOUTH</u>	HIGH PHOSPHORUS LOAD'G TO LAKE CHAMPLAIN; TOTAL P MASS LOAD = 165.2 MT/YR (#1)	DIAGN MONITOR'G DONE; TOTAL P EXPORT = 0.58 KG/HA/YR (#7); DISS P = 0.09 (#14)	REDUCE P FROM PT & NONPOINT SOURCES	EPA-SECT. 314-D/F	WWTFs <200K gpd & AERATED LAGOONS NOT REQ'D TO P REMOVAL	TARGET RIVER MOUTH P REDUCT'N # 1994
VT08-02	<u>ALLEN BROOK</u>	LAND DEVELOPMENT; EROSION/SEDIMENTATION			DEC-WQ; SECT. 319; ACT 250; LOCAL	ON-GOING BIOL. MONITORING	
	INTERVALE WETLAND	BURLINGTON LANDFILL; EVIDENCE OF LEACHATE ENTERING SURFACE WATER	WAS HI-THREAT IN '89; CON'T ASS'MT OF LEACHATE COLL'N SYS; NEED CHEM/BENTH SAMPL	LEACHATE COLL'N & TREATMENT	DEC-SW; DEC-WQ	NUS SI 9/86; CHEM. MONITORING BY BURL. PWD; BENTHOS SAMPLING FALL '88	LANDFILL CLOSED; SITE #770003

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VT08-02	LOWER WINOOSKI RIVER - SOUTH BURLINGTON	EVIDENCE OF SOUTH BURLINGTON LANDFILL LEACHATE ENTERING SURFACE WATER			DEC-SW	DISCONT'D REC'G WASTE 12/92	
	MUDDY BROOK	LAND DEVELOPMENT; EROSION/SEDIMENTATION	SOURCES NEED FURTHER ASSESSMENT		DEC-ENF; DEC-WQ; LOCAL; ACT 250; SECT. 319	HI-THREAT ('89); ON-GOING BIOL MONITOR'G	
	SUNDERLAND BROOK	HAZARDOUS WASTE SPILL W/ SURF WATER IMPACT			DEC-HMM; PETROLEUM CLEANUP FUND; RESPONSIBLE PARTIES	UNDER 10 VSA 1941 MGMT; ADD'L WORK COMPLETED; SMS TO EVALUATE STATUS	SITE #911033
		LAND DEVELOPMENT; EROSION/SEDIMENTATION			DEC-WQ; SECT. 319; ACT 250; LOCAL	ON-GOING BIOL. MONITORING	
	UNNAMED TRIBUTARY OF SUNDERLAND BROOK	RATHE BROS. LANDFILL; EVID. LEACHATE ENTER. SURF WATER; ALLEDGED HAZ WASTE DISP.	WAS HI-THREAT IN '89; NEED FURTHER ASS'MT SURF WATER & POSSIBLE IMPACT AQ. BIOTA		CERCLA; DEC-SW; DEC-WQ	DEC SI REPORT 4/87; FISH SURVEY '88; ON-GOING BIOL. MONITOR; PARTIALLY LINED	SITE #770006; DISCONT'D REC'G WASTE 12/92 (UNLINED) & 10/92 (LINED)
WINOOSKI RIVER - WILLISTON	EVIDENCE OF WILLISTON LANDFILL LEACHATE ENTERING SURFACE WATER			DEC-SW	DISCONT'D REC'G WASTE 12/92		

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VT08-02L01	SHELBURNE POND (SHELBURNE)	EXCESSIVE ALGAE AND NATIVE PLANT GROWTH, D.O. DEPLETION, AND NUTRIENT ENRICHMENT	EVAL. POSSIBLE RESTOR.MEASURES, SAMPLE TO DETERMINE IMPORTANCE OF INTERN.LOADING		LAKE ASSOC.; VT DF&W	ADV. LAY MONITORING TO 1991	LARGE FISHKILL (D.O. DEPLET'N) 8/93
	SHELBURNE POND (SHELBURNE); SURFACE AREA = 450ac	LIGHT EURASIAN MILFOIL INFEST'N; SINCE 1992	ANNUAL SHORELINE INSPECTIONS FOR NEW INFESTATIONS	BOTTOM SCREENING AND HAND PULLING IF SUFFICIENT TO PREVENT SPREAD	MILFOIL WATCHERS PROGRAM, SUMMER LAKES AND PONDS CREW SURVEYS	NO MILFOIL CTRL PROGRAM AT PRESENT ('93)	
VT08-04	MILL BROOK - SOUTH OF JERICHO CTR	EVIDENCE OF JERICHO LANDFILL LEACHATE ENTERING SURFACE WATER			DEC-SW	DISCONT'D REC'V'G WASTE 12/92	
VT08-05	WINOOSKI RIVER - MONTPELIER	HAZARDOUS WASTE SPILL W/ SURF WATER IMPACT			DEC-HMM; PETROLEUM CLEANUP FUND; RESPONSIBLE PARTIES	UNDER 10 VSA 1941 MGMT; MONITORING ON-GOING	SITE #911068
	WINOOSKI RIVER ABOVE MONTPELIER WWTF	MONTPELIER WWTF COLL'N SYSTEM PASSES COMBINED SEWER OVERFLOWS	PRELIM ENGIN EVAL DONE	CSO ABATEMENT	DEC-PF; SRF; STATE CONSTR. GRANTS PRGM	FINAL DESIGN PHASE I 1994	PHASED PROJECT PROPOSED 1995-2006
	WINOOSKI RIVER AT MIDDLESEX #2 DAM	DEWATERING OF BYPASS	AESTHETICS STUDY NEEDED	IMPROVED FLOW REGIME	VT DEC 10 VSA SEC.1003 CONFERENCE	UNLICENSED STATUS UNDER FERC REVIEW	
	WINOOSKI RIVER, IMPOUNDMENT OF MIDDLESEX #2 HYDRO	WATER LEVEL FLUCT'N BY HYDRO CAUSES IMPOUNDMENT STREAMBANK EROSION		REDUCE DRAWDOWN MAGNITUDE	10 VSA SECTION 1003 CONFERENCE; ANR/DEC-WQ		

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VT08-09	MOLLYS FALLS BROOK (2 MILES); WINOOSKI RIVER (10 MILES) BELOW DAM	AGRICULTURAL RUNOFF	NEEDS ASSESSMENT		USDA-ACP	ON-GOING	ON-GOING; UNSCHED. COMPLETION DATES, DEPENDENT ON FED. & PRIVATE \$\$
		EROSION AT POWERHOUSE OUTLET	NEEDS ASSESSMENT	STABILIZE RIVERBANK		UNLICENSED STATUS UNDER FERC REVIEW	
		FLOW REGULATION	FLOW STUDY NEEDED	IMPROVE FLOW REGIME	10 VSA 1003 CONFERENCE	UNLICENSED STATUS UNDER FERC REVIEW	
		POSSIBLE DISSOLVED OXYGEN PROBLEMS FROM HYPOLIMNETIC WITHDRAWAL	WATER QUALITY STUDY NEEDED	POSSIBLY AERATE DISCHARGE	DEC-WQ	UNLICENSED STATUS UNDER FERC REVIEW	
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	ASSESS PROBLEM	MEASURES TO EXCLUDE & PREVENT IMPINGEMENT & ENTRAINMENT	DEC-WQ; VT DF&W	UNLICENSED HYDRO STATUS UNDER FERC REVIEW	
		PROJECT BYPASSES ONE OF HIGHEST WATERFALLS IN VT	AESTHETICS STUDY NEEDED	IMPROVE FLOW REGIME	10 VSA SECTION 1003 CONFERENCE	UNLICENSED STATUS UNDER FERC REVIEW	
		STREAMBANK EROSION	NEEDS ASSESSMENT		USDA-ACP	ON-GOING	ON-GOING; UNSCHED. COMPLETION DATES, DEPENDENT ON FED. & PRIVATE \$\$
SUCKER BROOK BELOW PEACHAM POND	FLOW REGULATION BELOW HYDRO DAM	FLOW STUDY NEEDED	IMPROVE FLOW REGIME	10 VSA SECTION 1003 CONFERENCE	UNLICENSED STATUS UNDER FERC REVIEW		

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<u>VT08-09L02</u>	WEST HILL POND	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION; LAKE ASSOC.		
VT08-09L05	MOLLY'S FALLS POND	WATER LEVEL FLUCT'N BY HYDRO IMPAIRS FISHERY & RECREATION IN POND	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT	REDUCE DRAWDOWN MAGNITUDE	10 VSA SECTION 1003 CONF.; ANR-DF&W, DEC-WQ	UNLICENSED HYDRO STATUS; FERC LICENSE APP'L DISMISSED IN 1979	
VT08-11	LOWER LITTLE RIVER BELOW HYDRO DAM	LOW DOWNSTREAM DISSOLVED OXYGEN FROM HYPOLIMNETIC WITHDRAWAL	WATER QUALITY STUDY NEEDED	POSSIBLY AERATE DISCHARGE	FERC LICENSE & W.Q.CERTIFICATI ON	LICENSE EXPIRES IN 2001	
		POOR FLOW REGIME	FISHERIES FLOW NEEDS ASSESSMENT COMPLETED	IMPROVE FLOW REGIME	FERC LICENSING & W.Q.CERTIFICATI ON	LICENSE EXPIRES IN 2001	
VT08-11L02	WATERBURY RESERVOIR	H2O LEVEL FLUCT'N BY HYDRO IMPAIRS LAKE FISHERY, RECREATION, AESTHETICS, W.QUALITY	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT	REDUCE DRAWDOWN MAGNITUDE	FERC LICENSE & W.Q. CERTIFICATION	PROJECT UP FOR RE-LICENSING IN 2001	
<u>VT08-12</u>	WEST BRANCH OF LITTLE RIVER	CHANNEL WIDENING FROM 1984 FLOOD	RC & D ASSESSMENT 1975	RIP-RAP	USDA-ACP	ACTIONS BY MUNICIPALITY AND AOT; STREAM SEVERELY UNSTABLE	
		INCREASED PEAK STORMWATER FLOWS FROM URBAN AREA	NEEDS ASSESSMENT		DEC-PROTECTION		
		LACK OF STREAMBANK VEGETATION		REVEGETATE AND RIPRAP WHERE NECESSARY	USDA-ACP		

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<u>VT08-12</u>	WEST BRANCH OF LITTLE RIVER	POSSIBLE FAILED SEPTIC SYSTEMS	NEEDS ASSESSMENT		DEC-ENF; SECTION 319; LOCAL		
<u>VT08-14L05</u>	SABIN POND (WOODBURY LAKE)	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION; LAKE ASSOC.		
<u>VT08-14L08</u>	CURTIS POND	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION; LAKE ASSOC,		
<u>VT08-14L09</u>	BLISS POND	NUTRIENT ENRICHMENT	FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
<u>VT08-14L10</u>	NORTH MONPELIER POND (E.MONTPELIER); SURFACE AREA = 72ac	LIGHT EURASIAN MILFOIL INFEST'N; SINCE 1982	HERBIVORE RESEARCH PROJECT; EVAL'N ADD'L CTRL OPTIONS	HANDPULLING USED IN PAST	US EPA; VT ANCF & EWMCP; MORE \$\$ NEEDED TO EVAL/IMPL BEST CTRL METHODS	WEEVIL PRESENT; NOTED NATURAL MILFOIL DECLINE (1991)	HERBIVORE RESERACH PROJECT TO BE DONE 1995
VT08-15	JAIL BRANCH	WASHINGTON LANDFILL; LANDFILL LEACHATE ENTERING SURFACE WATER	WAS HI-THREAT IN '89; SURF WATER & AQ. BIOTA NEED ASSESSMENT		DEC-SW; DEC-WQ	DISCONT'D REC'G WASTE 6/92	20 YR GRD & SURF WATER MONITOR'G IN CLOSURE PLANS
	<u>JAIL BRANCH, BARRE CITY AND BELOW</u>	LAND DEVELOPMENT; EROSION/SEDIMENTATION			DEC-WQ; SECT. 319; ACT 250; LOCAL		
VT08-16	** NEAR STEVENS BRANCH	COAL TAR TANKS RESIDUAL LEAKS	ONGOING ASSESSMENT OF WATER AND SEDIMENT	INSTALL COLLECTION BASINS; INSTALL BARRIER TRENCH	DEC-HMM; DEC-WQ	GRD WATER DEPRESSION GOING & CIRC.; COLL 'N BASIN; MARKED IMPROVEMEN T;BIOL.TRT MT & MONIT	REMEDICATION ON-GOING

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VT08-16	GUNNER BROOK (MOUTH TO FARWELL ST. DUMP)	FARWELL ST. LANDFILL LEACHATE; SITE # 770027	WAS HI-THREAT IN '89; NEEDS FURTHER ASSESSMENT		CERCLA; DEC-SW; DEC-WQ	SITE INSPECT DONE; LMTD H2O, SEDIM'T, AQ. BIOTA SAMPL'G ('89); HI MEATLS - C & A	BASED ON SAMPLE RESULTS, EPA DECISION NOT TO PROCEED W/ REMOVAL ACTION
	POTASH BROOK - BARRE	HAZARDOUS WASTE SPILL W/ SURF WATER IMPACT			DEC-HMM; PETROLEUM CLEANUP FUND; RESPONSIBLE PARTIES	UNDER 10 VSA 1941 MGMT; INVESTIG'N ON-GOING	SITE #911125
	STEVENS BRANCH, FROM BARRE CITY LIMITS TO MOUTH, 5.8 MILES	TURBIDITY AND SEDIMENTATION FROM GRANITE TAILINGS AND SEDIMENT LAGOONS		MOVE TAILINGS FROM RIVERBANKS, ENLARGE LAGOONS OR FILTER DISCHARGES	DEC-WQ; DEC-ENF; DEC-PROTECTION	ON-GOING BIOL. MONITORING	
		URBAN RUNOFF INCLUDING SUSPECTED FLOOR DRAINS FROM COMMERCIAL BUILDINGS ON RIVER	FURTHER ASSESSMENT NEEDED TO LOCATE DRAINS	ASSOCIATED WITH GRANITE SHEDS	DEC-WQ; DEC-ENF	DRAINS CONSIDERED AS DISCHARGES ; COMPLAINTS INFREQUENT	ON-GOING BIOL. MONITORING
<u>VT08-16L03</u>	PECK'S POND	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
<u>VT08-17L02</u>	BAKER POND (BROOKFIELD)	NUTRIENT ENRICHMENT			DEC-WQ/LAKE PROTECTION PRGM		
<u>VT08-19L03</u>	GILLETTE POND	NUTRIENT ENRICHMENT; SEDIMENTATION	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
<u>VT08-20</u>	CLAY BROOK	LAND DEVELOPMENT CREATING INCREASED PEAK STORMWATER FLOWS	NEEDS ASSESSMENT		DEC-PROTECTION; ACT 250		

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<u>VT08-20</u>	CLAY BROOK	LOW FLOWS BELOW SNOWMAKING POND	LOW FLOW STUDY NEEDED	INCREASE FLOW	ACT 250 REVIEW	SKI AREA INVESTIGATING ALTERN. SOURCES	
		SOIL EROSION FROM CONSTRUCTION ACTIVITIES, GRAVEL PARKING LOT		EROSION CONTROLS NEEDED	DEC-ENF; DEC-PROTECTION; ACT 250	ON-GOING ENFORCEMENT ACTIONS FOR EROSION CONTROL; NEEDED ADD'L INVESTIGATIONS	
VT09-03	WHITE RIVER - ROYALTON	EVIDENCE OF BETHEL/ROYALTON LANDFILL LEACHATE ENTERING SURFACE WATER			DEC-SW	DEC PA COMPLETED 1/88; DISCONT'D RECV'G WASTE 1/93	SITE #770071
VT09-04	FIRST BRANCH - WHITE RIVER - CHELSEA	HAZARDOUS WASTE SPILL W/ SURF WATER IMPACT			DEC-HMM; PETROLEUM CLEANUP FUND; RESPONSIBLE PARTIES	UNDER 10 VSA 1941 MGMT; PUBLIC WATER SUPPLY PROTECTED; REMEDIATION ON-GOING	SITE #911014
<u>VT09-05</u>	SECOND BRANCH, WHITE RIVER, ROYALTON	AGRICULTURAL RUNOFF, STREAMBANK EROSION	CT R WQ ASSESSM'T (1994)		USDA-ACP		
<u>VT09-05L03</u>	SUNSET LAKE (BROOKFIELD)	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION; LAKE ASSOC.		
<u>VT09-06</u>	THIRD BRANCH, WHITE RIVER, GRANVILLE/BRAINTREE TO BETHEL	TURBIDITY, SEDIMENTATION, BANK EROSION	NEEDS FURTHER ASSESSMENT	REVEGETATE OR STABILIZE BANKS; MAINTAIN RIPARIAN BUFFER STRIPS	USDA-ACP		ON-GOING; UNSCHEDULED COMPLETION DATES, DEPENDENT ON FED. & PRIVATE \$

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VT09-07L04	SILVER LAKE (BARNARD)	SEDIMENTATION, AREAS OF NUISANCE WEED GROWTH, OCCASIONAL ALGAE BLOOMS, NUTRIENTS	FURTHER ASSESS.OF NUTRIENT & SEDIMENT SOURCES MAY BE NECESSARY AT A LATER DATE.		USDA; RC&D; DEC-WQ; LAKE PROTECT. PRGM; LAKE ASSOC.	ONGOING; RECV'D W/SHED SURVEY 1993	
		SILTATION, SEDIMENTATION	WATERSHED INVENTORY NEEDED	CONT'D IMPL NEEDED, WATERSHED NPS CONTROLS		PARTIAL WATERSHED SURVEY DONE	ON-GOING
VT10-01	LOWER OTTAUQUECHEE RIVER - N.HARTLAND RESERVOIR	ANNUAL WATER LEVEL FLUCTUATIONS		STABILIZE/REDUCE FLUCTUATION	RESERVOIR OWNED/OPERATED BY US ACOE	LIMITS ON FISH PRODUCTION POTENTIAL	
		SEDIMENTATION AT RESERVOIR; NATIVE AQ. PLANT GROWTH; ALGAL BLOOMS	NEEDS FURTHER ASSESSMENT		RESERV. OWNED/OPER. US ACOE; VT DF&W	UNABLE TO ESTABL. WARMWATER FISHERY	
	LOWER OTTAUQUECHEE RIVER BELOW TAFTSVILLE DAM TO N. HARTLAND RESERVOIR	POSSIBLE FISH PASSAGE PROBLEM AT DAM	PASSAGE ASSESSMENT DONE	MEASURES TO PREVENT IMPINGEMENT AND ENTRAINMENT AND ALLOW FOR PASSAGE			401 CERTIFICATION 12/92; LICENSE 12/93
VT10-03	OTTAUQUECHEE RIVER, BRIDGEWTR CRN TO WOODSTOCK	SEDIMENTATION; TURBIDITY; ELEV TEMPERATURE	CT R WQ ASSESSM'T (1994)		DF&W	ROAD RUNOFF; NO RIPARIAN VEG	
VT10-05	UPPER OTTAUQUECHEE RIVER	LAND DEVELOPMENT; EROSION/SEDIMENTATION			DEC-WQ; SECT. 319; ACT 250; LOCAL		
VT10-06	FALLS BROOK	LAND DEVELOPMENT; EROSION/SEDIMENTATION			DEC-WQ; SECT. 319; ACT 250; LOCAL		
	ROARING BROOK	LAND DEVELOPMENT; EROSION/SEDIMENTATION			DEC-WQ; SECT. 319; ACT 250; LOCAL		

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<u>VT10-06L02</u>	KENT POND	EXCESSIVE NATIVE PLANT & ALGAE GROWTH, NUTRIENT ENRICHMENT	SOURCES OF PROBLEM NEED FURTHER ASSESSMENT		DEC-WQ LAKE PROTECTION PROGRAM; VT DF&W	OCCASSION EXCESSIVE GROWTH ELODEA; ALGAE & NUTRIENT ENRICHMENT DEBATEABLE	
<u>VT10-07</u>	KEDRON BROOK - WOODSTOCK	AGRICULTURAL RUNOFF; PATHOGENS	NEEDS ASSESSMENT	AG WASTE MGMT	USDA-ACP; RIVERWATCH	ON-GOING (ACP); WAS HI-THREAT ('93)	COMPLETION DEPENDENT ON FED/PRIV \$\$
<u>VT10-08</u>	BROAD BROOK	BRIDGEWATER LANDFILL; LEACHATE ENTERING SURFACE WATER	WAS HI-THREAT IN '89; SURF WATER & AQ. BIOTA NEED SAMPL'G TO ASSESS POSS. IMPACT		DEC-SW; DEC-WQ	DISCONT'D REC'G WASTE 1992	20 YR GRD & SURF WATER MONITOR'G IN CLOSURE PLANS
<u>VT10-10</u>	GULF STREAM, BARNARD/POMFRET LINE TO BARNARD BRROK	SEDIMENTATION; SOME ENRICHMENT	CT R WQ ASSESSM'T (1994)		USDA-ACP; DFF&R; ACT 250; LOCAL	AGRICULTURAL, SILVICULTURAL & RUNOFF FROM LAND DEVELOP'T IDENTIFIED	
<u>VT10-11</u>	BLACK RIVER; FROM MOUTH TO 2.5 MI UPSTRM	NUTRIENT & ORGANIC ENRICHMENT; PATHOGENS; SEDIMENTATION	CT R WQ ASSESSM'T (1994); SOURCES NEED FURTHER ASSESSM'T		DEC-WQ; DEC-PF; RIVERWATCH	MUTLIPL CSO; MULTIPLE HYDROS; DEVELOPED AREA	
<u>VT10-13</u>	BLACK RIVER BELOW CAVENDISH HYDRO DAM	DOWNSTREAM FISH PASSAGE PROBLEM AT DAM	NEEDS ASSESSMENT	MEASURES TO PREVENT IMPINGEMENT AND ENTRAINMENT AND TO ALLOW PASSAGE	FERC LICENSE; W.Q. CERTIFICATION	LICENSE EXPIRES 1993; UPSTREAM PASSAGE ISSUE DEFERRED	LICENSE APPL'N FILED 12/91

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VT10-13	BLACK RIVER BELOW CAVENDISH HYDRO DAM	POOR FLOW REGIME	FISHERIES FLOW NEEDS STUDY DONE; OTHER FLOW STUDIES DONE	CVPS AGREED TO RUN- OF-RIVER AT POWER HOUSE; GORGE BYPASS FLOWS BEFORE FERC	FERC LICENSE & W.Q.CERTIFICATI ON	UTILITY IMPL. INTERIM FLOW RELEASES 1988; LICENSE APPL'N UNDER REVIEW	LICENSE APPL'N FILED 12/91; 401 CERTIFICATION 12/92; LICENSE 12/93
		PROJECT BYPASSES A GORGE OF STATEWIDE SIGNIFICANCE	AESTHETICS FLOW STUDY DONE	IMPROVE FLOW REGIME	FERC LICENSING & W.Q.CERTIFICATI ON	LICENSE EXPIRES 1993	SEE ABOVE
<u>VT10-13L02</u>	NORTH SPRINGFIELD RESERVOIR	SEDIMENTATION ESP. FROM STOUGHTON POND; NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT			US-ACOE FACILITY	
VT10-14	BLACK RIVER, 1 MILE ABOVE TO 1 MILE BELOW LUDLOW VILLAGE	SOIL EROSION FROM CONSTRUCTION SITES; HIGH TURBIDITY & SEDIMENT LOADS	NEEDS FURTHER ASSESSMENT; PROBLEM CONTRIB. SEASONALLY TO W.Q. PROBLEMS TO MOUTH		DEC-ENF; ACT 250; LOCAL		
	<u>SOAPSTONE BROOK, LUDLOW</u>	METALS (Fe); AQ HABITAT IMPAIRMENT	CT R WQ ASSESSM'T (1994)		DEC-WQ; DEC-WW	MINE DRAINAGE ASSESSM'T ON-GOING; BIOL MONITOR'G	
	TRIBUTARY TO JEWELL BROOK - LUDLOW	EVIDENCE OF LUDLOW LANDFILL LEACHATE ENTERING SURFACE WATER			DEC-SW	DISCONT'D RECV'G WASTE 12/91	
<u>VT10-15L08</u>	LAKE RESCUE (LUDLOW)	NUISANCE WEED GROWTH IN LIMITED AREAS, SEDIMENTATION, NUTRIENT ENRICHMENT	FURTHER ASSESSMENT OF PROBLEM, AND NUTRIENT AND SEDIMENT SOURCES NEEDED		DEC LAKE PROTECTION PRGM; LAKE ASSOC.		WATERSHED SURVEY 1992

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<u>VT10-16</u>	NORTH BRANCH OF BLACK RIVER, FROM STOUGHTON POND TO 3.5 MI UPSTREAM	NATURAL AND AGRICULTURE-RELATED STREAMBANK EROSION IN HIGHLY ERODABLE SOILS	NEEDS FURTHER ASSESSMENT	REVEGETATE BANKS, RIPRAP WHERE NECESSARY, CREATE VEGETATED BUFFER STRIPS	USDA-ACP	ON-GOING; POND'S UPPER BOAT ACCESS DISCONTINUED; THREATS TO OTHER	ON-GOING; UNSCHEDULED COMPLETION DATES, DEPENDENT ON FED. & PRIVATE \$\$
		NUTRIENT ENRICHMENT AND POSSIBLE PATHOGENS FROM AGRICULTURAL RUNOFF	NEEDS FURTHER ASSESSMENT	IMPROVED TIMING OF FERTILIZER APPL., BETTER MANURE STORAGE AND APPLICATION	USDA-ACP	ON-GOING	ON-GOING; UNSCHED. COMPLETION DATES, DEPENDENT ON FED. & PRIVATE \$\$
<u>VT10-16L03</u>	STOUGHTON POND	SEDIMENTATION, NUTRIENTS, WATER LEVEL FLUCTUATION	FURTHER ASSESSMENT OF PROBLEMS AND SOURCES NEEDED	AGRICULTURAL RUNOFF PREVENTION MEASURES NEEDED UPSTREAM		US-ACOE FACILITY; FIXED WEIR OUTLET KEEPS WATER LEVEL STABLE	
<u>VT11-00</u>	MOSES	CRITICALLY ACIDIFIED	ON-GOING; CHANGED FROM HIGH-THREAT ('84)	REDUCE EMISSIONS FROM OUT-OF-STATE SOURCES	DEC-WQ; ACID PRECIP. MONITOR'G	1990 CLEAN AIR ACT SO2 & NOX EMISSIONS REDUCT'N	REDUCT'N NEXT 10 - 12 YRS
VT11-08	BRUCE BROOK	NEWFANE LANDFILL; LEACHATE ENTERING SURFACE WATER	WAS HI-THREAT IN '89; NEEDS FURTHER ASS'MT SURF WATER & AQ. BIOTA		DEC-SW; DEC-WQ	SURF WATER SAMPL'G SUMMER '88; DISCONT'D RECV'G WASTE 6/92	20 YR GRD & SURF WATER MONITOR'G IN CLOSURE PLANS
	STICKNEY BROOK	SEASONALLY DEVOID OF FLOW BELOW DIVERSION DAM; SEDIMENT DISCHARGE & DREDGING	CT R WQ ASSESSM'T (1994)	IMPROVE FLOW REGIME	BRATTLEBORO CITY	WATER SUPPLY RESERVOIR ABOVE DAM	

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<u>VT11-09L01</u>	KENNY POND	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
VT11-10	WEST RIVER, BELOW BALL MOUNTAIN DAM	AQ HABITAT DEGRADED FROM 2 SEDIMENT RELEASES (1993)	FFNA COMPLETE; ASSESS DOWNSTREAM IMPACTS FROM DRAWDOWNS	DETERMINE DRAWDOWN METHODS THAT CREATE LEAST ENVIRON.IMPACT TO DOWNSTREAM	US ACOE; DEC-ENF; VDF&W	NO MIN FLOW BY ACOE BASED ON ANY BIOL/WQ CRITERIA; HABITAT REMED'N/EVAL UNDERWAY	SEE ALSO VT11-10L01 & VT11-10L02
VT11-10L01	BALL MOUNTAIN RESERVOIR (JAMACIA)	UP & DOWNSTREAM FISH PASSAGE AT DAM - ESP. ANADROMOUS ATL. SALMON			US-ACOE FACILITY	US-ACOE NOW DEVELOPING FACILITIES & RESERVOIR OPERATION CHANGES	PASSAGE RESOLVED 1993-1994
	BALL MOUNTAIN RESERVOIR (JAMAICA)	WATER LEVEL FLUCTUATION, SEDIMENTATION	PROBLEM NEEDS FURTHER ASSESSMENT		RESERVOIR OWNED/OPERATED BY U.S. ACOE		
VT11-10L02	TOWNSHEND RESERVOIR (TOWNSHEND)	UP & DOWNSTREAM FISH PASSAGE AT DAM - ESP. ANADROMOUS ATL. SALMON			US-ACOE	US-ACOE DEVELOPING FACILITIES & RESERVOIR OPERATIONAL CHANGES	PASSAGE RESOLVED 1993-1994
		WATER LEVEL FLUCTUATION	PROBLEM NEEDS FURTHER ASSESSMENT		RESERVOIR OWNED/OPERATED BY U.S. ACOE		
<u>VT11-12L01</u>	COLE POND	NUTRIENT ENRICHMENT	FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION; LAKE ASSOC.		
<u>VT11-14</u>	WARDSBORO BROOK, 7 MI. FROM WEST WARDSBORO TO MOUTH	STREAMBANK EROSION; SEDIMENTA'N; CHANNELIZ'N	CT R WQ ASSESSM'T (1994); FURTHER LOCATE PROBELM AREAS	REVEGETATE AND RIPRAP WHERE NECESSARY	USDA-ACP	ON-GOING (ACP); WAS HI-THREAT ('93)	UNSCHEDULED COMPL. DEPENDENT ON FED. & PRIVATE \$\$

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VT11-15	BALL MOUNTAIN BROOK, ABOVE NORTH BRANCH CONFLUENCE	FISHERIES CRITICALLY IMPACTED FROM ACIDIFICATION		REDUCE EMISSIONS FROM OUT OF STATE SOURCES	VT DF&W; DEC-WQ; ACID PRECIP. MONITOR'G	1990 CLEAN AIR ACT; SO2 & NOX EMISSIONS REDUCT'N	REDUCT'N OVER NEXT 10 - 12 YRS
	NORTH BRANCH BROOK TO PIKES FALLS	AESTHETIC & WQ (NUTRIENTS, METALS, ORG CARBON) IMPAIR'TS; URBAN RUNOFF; SEDIMENT	DEC WQ EVAL RPT (8/91); SCS STRESS/STABILITY STUDY (10/92)	EMPLOY VEG'TED BUFFERS; CORRECTIVE OPTIONS FOR NPS DISCHARGES BEING EVALUATED	DEC-WQ; DEC-WW	BIOL COMMUNITIE S MEET CLASS B STDS; ON-GOING BIOL MONITOR'G	UNSCHE D COMPLETION DATES
VT11-15L01	FORRESTER POND	CRITICALLY ACIDIFIED	chloride levels increasing from 1 to 12 mg/l betw 1983-1993 (1994)	REDUCE EMISSIONS FROM OUT-OF-STATE SOURCES	DEC-WQ; ACID PRECIP. MONITOR'G	ON-GOING ACID PRECIP. MONITOR'G; 1990 CLEAN AIR ACT, SO2 & NOX EMISSIONS REDUC'N	REDUCT'N OVER NEXT 10 - 12 YRS
VT11-16	WINHALL RIVER, HEADWATERS TO KENDALL FARM ROAD	FISHERIES CRITICALLY IMPACTED FROM ACIDIFICATION		REDUCE EMISSIONS FROM OUT OF STATE SOURCES	VT DF&W; DEC-WQ; ACID PRECIP. MONITOR'G; GMNF PROTECT'N AIR QUAL. RELATED VALUES	1990 CLEAN AIR ACT SO2 & NOX EMISSIONS REDUCT'N; LYE BROOK EMISSIONS OFFSET	SO2 & NOX REDUCT'N OVER NEXT 10 - 12 YRS
VT11-17	WEST RIVER - LONDONDERRY	HAZARDOUS WASTE SPILL W/ SURF WATER IMPACT			DEC-HMM; PETROLEUM CLEANUP FUND; RESPONSIBLE PARTIES	UNDER 10 VSA 1941 MGMT	SITE #911027
	WEST RIVER, WESTON/LONDONDERRY AREA	ERODING STREAMBANK; PHYSICAL HABITAT IMPAIRMENT	CT R WQ ASSESM'T (1994)	RESTORE RIPARIAN VEGETATION	DEC-WW; DF&W	1993 'ESTATE' CLEARING	

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<u>VT11-18L03</u>	LILY POND - LONDONDERRY	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
VT12-01	LOWER DEERFIELD RIVER BELOW HARRIMAN RESERVOIR	COMPLETE LACK OF WATER	FLOW STUDY NEEDED; PRESENCE OF 2 RARE PLANT SPECIES	RESTORE IN-STREAM FLOWS	FERC LICENSE & W.Q. CERTIFICATION	DAM OUTLET EVALUATED (4/92); STUDY PLAN TO BE DEVELOPED	LICENSE APPL'N FILED 12/91; 401 CERTIFICATION 12/92; LICENSE 12/93
		POSSIBLE DOWNSTREAM FISH PASSAGE PROBLEM AT DAM	ASSESS PROBLEM	MEASURES TO PREVENT IMPINGEMENT AND ENTRAINMENT AND ALLOW FOR PASSAGE	FERC LICENSE & W.Q. CERTIFICATION	AS ABOVE	AS ABOVE
		POSSIBLE W.Q. PROBLEMS DOWNSTREAM OF POWERHOUSE FROM HYPOLIMNETIC WATER WITHDRWL	WATER QUALITY STUDY NEEDED	POSSIBLE AERATION OF DISCHARGE	FERC LICENSE & W.Q. CERTIFICATION	LMTD STUDY SHOWS D.O. VIOLATION	AS ABOVE
VT12-01L01	HARRIMAN RESERVOIR	WATER LEVEL FLUCT'N BY HYDRO IMPAIRS LAKE'S FISHERY, RECREATION, AESTHETICS	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREM'T; STUDY LAKE PRODUCTIVITY LOSSES	REDUCE DRAWDOWN MAGNITUDE	FERC LICENSE & W.Q. CERTIFICATION	LICENSE EXPIRES 1993	LICENSE APPL'N FILED 12/91; 401 CERTIFICATE 12/92
<u>VT12-02L02</u>	HOWE POND	CRITICALLY ACIDIFIED	ON-GOING; CHANGED FROM HIGH-THREAT ('94)	REDUCE EMISSIONS FROM OUT-OF-STATE SOURCES	DEC-WQ; ACID PRECIP. MONITOR'G	1990 CLEAN AIR ACT SO2 & NOX EMISSIONS REDUCT'N	REDUCT'N NEXT 10 - 12 YRS

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<u>VT12-02L03</u>	STAMFORD POND	CRITICALLY ACIDIFIED		REDUCE EMISSIONS FROM OUT-OF-STATE SOURCES	DEC-WQ; ACID PRECIP. MONITOR'G	ON-GOING ACID PRECIP. MONITOR'G; 1990 CLEAN AIR ACT SO2 & NOX EMISSION REDUCT'N	REDUCT'N OVER NEXT 10 - 12 YRS
VT12-03	UPPER DEERFIELD RIVER BELOW SOMERSET DAM AND SEARSBURG DAM	POOR BUFFERING CAPACITY; SUSCEPTIBILITY TO ACID RAIN	WATER QUALITY STUDY IN 1984			1990 CLEAN AIR ACT SO2 & NOX EMISSIONS REDUCT'N	REDUCT'N OVER NEXT 10 - 12 YRS
		POOR FLOW REGIME	FLOW STUDIES DONE	IMPROVE FLOW REGIMES	FERC LICENSE & W.Q. CERTIFICATION	LICENSE EXPIRES 1993	LICENSE APPL'N FILED 12/91; 401 CERTIFICATE 12/92
VT12-03L02	SEARSBURG RESERVOIR	WATER LEVEL FLUCT'N BY HYDRO IMPAIRS LAKE'S FISHERY & RECREATION	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT	REDUCE DRAWDOWN MAGNITUDE	FERC LICENSE & W.Q. CERTIFICATION	LICENSE EXPIRES 1993	LICENSE APPL'N FILED 12/91; 401 CERTIFICATE 12/92
VT12-03L03	SOMERSET RESERVOIR (SOMERSET)	WATER LEVEL FLUCT'N BY HYDRO IMPAIRS FISHERY & ENDANG. SPECIES [NEST & INCUB]	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT	REDUCE DRAWDOWN MAGNITUDE	FERC LICENSE & W.Q. CERTIFICATION	POOR DOCUMENTAT ION OF LOON SUCCESS	LICENSE APPL'N FILED 12/91; 401 CERTIFICATE 12/92
<u>VT12-04L01</u>	ADAMS RESERVOIR (WOOD)	CRITICALLY ACIDIFIED	ON-GOING; CHANGED FROM HI-THREAT ('94)	REDUCE EMISSIONS FROM OUT OF STATE SOURCES	DEC-WQ ACID PRECIP. MONITORING PROGRAM	ON-GOING ACID PRECIP. MONITOR'G; 1990 CLEAN AIR ACT SO2 & NOX EMISSIONS REDUCT'N	REDUCT'N NEXT 10 - 12 YRS

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VT12-04L04	LITTLE POND (WOOD)	FISHERY IMPACTED FROM ACIDIC ATMOSPHERIC DEPOSITION		REDUCE EMISSIONS FROM OUT OF STATE SOURCES	VT DF&W; DEC-WQ; ACID PRECIP. MONITOR'G	ON-GOING ACID PRECIP. MONITOR'G; 1990 CLEAN AIR ACT SO2 & NOX EMISS. REDUCT'N	REDUCT'N OVER NEXT 10 - 12 YRS
VT12-05	HALL BROOK - WILMINGTON	EVIDENCE OF WILMINGTON LANDFILL LEACHATE ENTERING SURFACE WATER			DEC-SW	DISCONT'D RECV'G WASTE 11/92	
	NORTH BRANCH OF DEERFIELD RIVER - WILMINGTON	HAZARDOUS WASTE SPILL W/ SURF WATER IMPACT			DEC-HMM; PETROLEUM CLEANUP FUND; VT AOT	UNDER 10 VSA 1941 MGMT; UST CONTAM'N FOUND; GRD WATER SAMPLING PENDING	SITE #911119
	NORTH BRANCH OF DEERFIELD RIVER, BASE OF MT. SNOW TO MOUTH	LOW FLOWS BELOW SNOWMAKING PONDS	NEEDS FURTHER ASSESSMENT				
		REMOVAL OF RIPARIAN VEGETATION AND STREAMBANK EROSION	NEEDS FURTHER ASSESSMENT	REVEGETATE AND RIPRAP WHERE NECESSARY	USDA-ACP; ACT 250; LOCAL	ON-GOING (ACP)	ON-GOING; UNSCHED. COMPLETION DATES, DEPENDENT ON FED. & PRIVATE \$\$
	SOIL EROSION FROM ROAD CONSTRUCTION	NEEDS FURTHER ASSESSMENT		ACT 250; VT AOT; LOCAL; DEC-ENF			
	SOIL EROSION OR HIGH PEAK STORMWATER FLOWS FROM LAND DEVELOPMENT	NEEDS FURTHER ASSESSMENT		DEC-WQ; DEC-PROTECTION; ACT 250; LOCAL	ON-GOING BIOL. MONITORING		

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VT12-05L01	HAYSTACK POND	FISHERY IMPACTED FROM ACIDIC ATMOSPHERIC DEPOSITION		REDUCE EMISSIONS FROM OUT-OF-STATE SOURCES	VT DF&W; DEC-WQ; ACID PRECIP. MONITOR'G	ON-GOING ACID PRECIP. MONITOR'G; 1990 CLEAN AIR ACT SO2 & NOX EMISS. REDUCT'N	REDUCT'N OVER NEXT 10 - 12 YRS
VT13-01	CONNECTICUT RIVER, WILDER DAM	LACK OF DOWNSTREAM FISH PASSAGE FOR ATLANTIC SALMON		PROVIDE PASSAGE FACILITIES	VT DF&W; USF&WS; NEPCO	ACTIONS PER M.O.U.	1994 TARGET DATE FOR MEASURES
	CONNECTICUT RIVER, WILDER DAM TO ASCUTNEY VILLAGE	FLUCTUATING FLOWS ASSOC. W/ HYDROPOWER PRODUCTION		IMPROVE FLOW REGIME	VT DF&W; USF&WS; VT DEC; NEPCO; NH & VT 401 W.Q. CERTIFICATION		
VT13-02	CONNECTICUT RIVER, ABOVE BELLOWS FALLS DAM	WATER LEVEL FLUCT'N; DEWATERED SHORELINES/WETLANDS; DOWNSTREAM FISH PASSAGE		REDUCE FLUCT'N	VT & NH WQ AGENCIES; NEPCO; FERC	FISH PASSAGE BEING ADDRESSED THRU M.O.U.	FISH M.O.U. IN PLACE BY 1994
	CONNECTICUT RIVER, ABOVE BELLOWS FALLS DAM, SPRINGFIELD	RES'WATER LEVEL FLUCTU'N; DESTABIL/ERODING STRMBANKS; IMPACT'G SIGN. ARCHL. SITE	2500 TO 3000 CUBIC METERS OF SOIL LOSS/YR OVER 0.5+ KM	REDUCE RESERVOIR WATER LEVEL FLUCTU'N; STABILIZE STRMBANKS	VT ADCA-DHP; FERC; NEPCO	IMPACTS TO SKITCHEWAUG SITE	
	CONNECTICUT RIVER, ASCUTNEY VILLAGE TO BELLOWS FALLS DAM	STREAMBANK EROSION; PHYSICAL HABITAT IMPAIRMENT	ASSESS FOR PRIORITY AREAS	REVEGETATE TO STABILIZE VS. RIPRAP	USDA-ACP; CT R WQ ASSESM'T (1994)	ON-GOING (ACP); WAS HI-THREAT ('93)	UNSCHEDULED COMPL. DEPENDENT ON FED. & PRIVATE \$\$
VT13-03	CONNECTICUT RIVER, BELLOWS FALLS DAM	LACK OF DOWNSTREAM FISH PASSAGE FOR ATLANTIC SALMON		PROVIDE PASSAGE FACILITIES	VT DF&W; US F&WS; NEPCO	ACTIONS PER M.O.U.	1994 TARGET DATE FOR MEASURES

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VT13-03	CONNECTICUT RIVER, BELOW BELLOWS FALLS DAM	FLUCTUATING FLOWS BY HYDROPOWER PRODUCTION		IMPROVE FLOW REGIME	VT DF&W; US F&WS; VT DEC; NEPCO		
	CONNECTICUT RIVER, BELOW BELLOWS FALLS DAM TO WEST RIVER CONFL	STREAMBANK EROSION; PHYSICAL HABITAT IMPAIRMENT	CT R WQ ASSESSM'T (1994)		DEC-WQ; USDA-ACP	LMTD BIOL MONITOR'G; ON-GOING (ACP)	
VT13-04	** CONNECTICUT RIVER - ABOVE VERNON DAM, BRATTLEBORO	GRDWATER CONTAMINATED BEYOND DRINK'G WATER STRDRS BY LEACHATE FROM LANDFILL	SITE INVESTIGATION UNDERWAY; WINDHAM REGIONAL LANDFILL		DEC-SW; DEC-WS; GRD WATER RISK ADVISORY	GRDWATER RE-CLASSIFICATION APPL'N UNDERWAY	
	CONNECTICUT RIVER - ABOVE VERNON DAM	WATER LEVEL FLUCT'N; DEWATERED SHORELINE/WETLANDS; DOWNSTREAM FISH PASSAGE		REDUCE FLUCT'N	VT & NH WQ AGENCIES; NEPCO; FERC	FISH PASSAGE BEING ADDRESSED THRU M.O.U.	FISH M.O.U. IN PLACE BY 1994
VT13-05	CONNECTICUT RIVER, BELOW VERNON DAM	FLUCTUATING FLOWS BY HYDROPOWER PRODUCTION		IMPROVE FLOW REGIME	VT DF&W; USF&WS; VT DEC; NEPCO		
	CONNECTICUT RIVER, VERNON DAM	LACK OF DOWNSTREAM FISH PASSAGE FOR AMER. SHAD & ANADR. ATLANTIC SALMON		PROVIDE DOWNSTREAM FISH PASSAGE FACILITIES	VT DF&W; US F&WS; NEPCO	ACTIONS PER M.O.U.	1994 TARGET DATE FOR MEASURES
VT13-06	LOWER KILBURN BROOK	EVIDENCE OF HARTFORD LANDFILL LEACHATE ENTERING SURFACE WATER			DEC-SW	DISCONT'D RECV'G WASTE 7/92	
<u>VT13-08L01</u>	MILL POND	SEDIMENTATION, NUTRIENT ENRICHMENT & ALGAE GROWTH	SOURCES OF PROBLEM NEED FURTHER ASSESSMENT				

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<u>VT13-08L01</u>	MILL POND (WINDSOR); SURFACE AREA = 70ac	MODERATE EURASIAN WATERMILFOIL INFEST'N; INFEST'N SINCE 1987	HERBIVORE RESEARCH PROJECT; EVAL OF MILFOIL CTRL OPTIONS		US EPA; VT ANCF & EWMCP; MORE \$\$ NEEDED TO EVAL/IMPL BEST CTRL METHODS	HANDPULLING USED AS CTRL METHOD IN PAST	HERBIVORE RESEARCH PROJECT TO BE DONE 1995
<u>VT13-12</u>	SACKETTS BROOK IN PUTNEY	FAILED SEPTIC SYSTEMS FIRE POND DESILTING; PHYSICAL HABITAT IMPAIRMENT HIGH SEDIMENT'N & TURBIDITY; PAST FAILURE OF PAPER PROCESS'G PONDS/LAGOONS	NEEDS ASSESSMENT CT R WQ ASSESSM'T (1994) NEEDS ASSESSMENT ESP. TESTING FOR ANY ACCUMULATED TOXICS	CONDUCT SEPTIC SYSTEM SURVEY	DEC-ENF; SECTION 319 DEC-WQ; DEC-WW	ON-GOING BIOL. MONITORING	SURVEY WORK UNSCHEDULED
VT13-14	WHESTONE BROOK - BRATTLEBORO	HAZARDOUS WASTE SPILL W/ SURF WATER IMPACT			DEC-HMM; PETROLEUM CLEANUP FUND; RESPONSIBLE PARTIES	UNDER 10 VSA 1941 MGMT; INVESTIG'N TO BE STARTED BY TOWN OF BRATTLEBORO	SITE #911059
	<u>WHESTONE BROOK - LOWER</u>	ENCROACH'G URBANIZ'N; STORMWATER; CONSTR. EROSION; RIPARIAN DEVELOPM'T	CT R WQ ASSESM'T (1994)		VT DEC; NRCD; LOCAL; ACT 250; SECT. 319	WAS HI-THREAT ('93)	
<u>VT13-14L02</u>	PLEASANT VALLEY RESERVOIR (BRATTLEBORO)	EXCESSIVE ALGAE GROWTH, NUTRIENT ENRICHMENT, SEDIMENTATION, D.O. DEPLETION	PROBLEMS NEED FURTHER ASSESSMENT				

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<u>VT13-17L02</u>	WEATHERHEAD HOLLOW POND	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
<u>VT14-02</u>	COPPERAS BROOK	HIGH METALS IN DRAINAGE FROM ABANDONED ELIZABETH MINE AND FROM TAILINGS	US ACOE SECTION 22 STUDY DONE (1990)	UNKNOWN	USDA; US ACOE; EPA; DEC-WQ	NO REMEDIATION PLANNED; ON-GOING BIOL. MONITORING ; FISH TISSUE BELOW SUPERFUND	
		LOSS OF RIPARIAN VEGETATION	COLORADO SCHOOL OF MINES; U.S. ARMY CORPS OF ENGINEERS	REVEGETATE, RIP-RAP WHERE NECESSARY	USDA-ACP	ONGOING (1988) LIMITED EVALUATION OF VEGETATION RE-ESTABLISHMENT	ON-GOING
	WEST BRANCH OF OMPOMPANCOOSUC RIVER	HIGH METALS IN DRAINAGE FROM ABANDONED ELIZABETH MINE AND FROM TAILINGS	PROBLEM WELL KNOWN	OPTIONS SPECIFIED	USDA; US ACOE; EPA	NO REMEDIATION PLANNED; DEC PA DONE (3/90); DEC SSI DONE (8/91)	SCS LMTSD EXP'TL SEEDING SINCE 1989; SITE # 770186
		LOSS OF RIPARIAN VEGETATION		REVEGETATE, RIP-RAP WHERE NECESSARY, STRMBNK STABIL'ZN	USDA-ACP; DEC-WQ	ON-GOING BIOL. MONITORING	ON-GOING; UNSCHED. COMPLETION DATES, DEPENDENT ON FED. & PRIVATE \$\$

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<u>VT14-03</u>	ELY BROOK BELOW ELY MINE	HIGH METALS IN DRAINAGE FROM ABANDONED ELY MINE	PROBLEM WELL KNOWN		USDA; US ACOE; EPA	DEC PA DONE (1/91); SI-IP; USDA/SCS INVEST'G REVEG. TECHN. FOR SITE	LMTD EXP'TL SEEDING SINCE 1989; SITE # 770183
	OMPOMPANOOSUC RIVER BELOW ELY MINE	HIGH METALS IN DRAINAGE FROM ABANDONED ELY MINE AND FROM TAILINGS	PROBLEM WELL KNOWN	UNKNOWN	USDA; US ACOE; EPA; DEC-WQ	SCS INVESTIGATING RE-VEGETATION TECHN. FOR SITE; ON-GOING BIOL. MONITORING	
		LOSS OF RIPARIAN VEGETATION		REVEGETATE, RIP-RAP, STIMBNK STABIL'ZN	USDA-ACP		
VT14-04	WAITS RIVER, BELOW BRADFORD DAM	POOR FLOW REGIME IN BYPASS SEGMENT	CT R WQ ASSESSM'T (1994)	IMPROVE FLOW REGIME	DEC-WQ; SECT. 1003 CONFERENCE	UNLICENSED	
<u>VT14-07L01</u>	LEVI POND	CRITICALLY ACIDIFIED	ON-GOING; CHANGED FROM HIGH-THREAT ('94)	REDUCE EMISSIONS FROM OUT-OF-STATE SOURCES	DEC-WQ; ACID PRECIP. MONITOR'G	1990 CLEAN AIR ACT SO2 & NOX EMISSIONS REDUCT'N	REDUCT'N NEXT 10 - 12 YRS
<u>VT14-07L02</u>	TICKLENAKED POND	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
VT14-09	STEVENS RIVER, BELOW BARNET HYDRO DAM	POOR FLOW REGIME	CT R WQ ASSESSM'T (1994)	IMPROVE FLOW REGIME	DEC-WQ; SECT. 1003 CONFERENCE	UNLICENSED	

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VT14-09L05	HARVEY'S LAKE (BARNET)	EXCESSIVE ALGAE GROWTH, NUTRIENT ENRICHMENT	EXTENSIVE DIAGNOSTIC STUDY HAS BEEN COMPLETED	RESTORATION PLAN HAS BEEN DEVELOPED	DEC LAKES & PONDS PRGRM; LAKE ASSOC.	LOCAL SUPPORT FOR IMPL. RESTORATION WORK TO BE SOUGHT; ADV. LAY MONITOR. '79-'87		
VT15-01	PASSUMPSIC RIVER FROM PIERCE MILLS DAM TO 5 MILES BELOW PASSUMPSIC DAM	FLOW REG'L AT 4 DAMS (PIERCE MILLS, ARNOLD, GAGE, PASSUMPSIC)	FLOW STUDIES DONE	IMPROVE FLOW REGIME	FERC LICENSE & W.Q. CERTIFICATION	LICENSE EXPIRES 1993	LICENSE APPL'N FILED 12/91; 401 TO BE ISSUED 12/92; FERC LICENSE 12/93	
		POSSIBLE FISH PASSAGE PROBLEM AT DAMS	PASSAGE STUDIES DONE	MEASURES TO PREVENT IMPINGEMENT AND ENTRAINMENT AND ALLOW FOR PASSAGE	FERC LICENSE & W.Q. CERTIFICATION	LICENSE EXPIRES 1993	LICENSE APPL'N FILED 12/91	
		ST. JOHNSBURY WWTF COLL'N SYSTEM PASSES COMBINED SEWER OVERFLOWS		CSO ABATEMENT	DEC-PF; SRF; STATE CONSTR. GRANTS PRGM	PRELIM ASSESSM'T DONE; PHASED PROJECT; PHASE I FINAL DESIGN NOW	CONSTRUCTION 1994-1997	
		PASSUMPSIC RIVER, IMPOUNDMENTS OF GAGE & PASSUMPSIC HYDROS	WATER LEVEL FLUCT'N BY HYDROS IMPAIRS IMPOUNDMENTS' FISHERIES	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT	REDUCE DRAWDOWN MAGNITUDE	FERC LICENSE & W.Q. CERTIFICATI ON	LICENSE EXPIRES IN 1993	LICENSE APPL'N FILED 12/91
VT15-02	IMPOUNDMENT OF WEST DANVILLE HYDRO, JOES BROOK	WATER LEVEL FLUCT'N BY HYDRO IMPAIRS IMPOUNDMENT FISHERY	FISHERY HABITAT REQUIREMENT ASSESSMENT DONE	REDUCE DRAWDOWN MAGNITUDE	10 VSA SECTION 1003 CONFERENCE; ANR-DF&W, DEC-WQ	UNLICENSED HYDRO STATUS UNDER FERC REVIEW		
	JOES BROOK IN WEST DANVILLE	AGRICULTURAL RUNOFF	NEEDS ASSESSMENT		USDA-ACP	ON-GOING	ON-GOING; UNSCHED. COMPLETION DATES, DEPENDENT ON FED. & PRIVATE \$\$	

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VT15-02	JOES BROOK IN WEST DANVILLE	HYDRO DAM AT OUTLET OF JOES POND CREATES POOR FLOW REGIME DOWNSTREAM	FLOW STUDY NEEDED	IMPROVE FLOW REGIME	10 VSA SECTION 1003 CONFERENCE	UNLICENSED STATUS UNDER FERC REVIEW; AQUATIC BIOTA STUDY DONE	
VT15-04	SLEEPERS RIVER, BELOW EMERSON FALLS DAM	POOR FLOW REGIME IN BYPASS SEGMENT	CT R WQ ASSESSM'T (1994)	IMPROVE FLOW REGIME	DEC-WQ; SECT. 1003 CONFERENCE	UNLICENSED	
<u>VT15-05L02</u>	BEAN POND	NUTRIENT ENRICHMENT	FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
VT15-06	** MILLERS RUN	SUBSURFACE DISPOSAL SYSTEM AND SURFACE DUMPING OF HAZARDOUS WASTE FOR 9 YEARS	WAS LO-THREAT IN '89; HI ORGANICS & METALS IN GRD WATER; NO CONTAM'N SURF WATER		DEC-HMM	REMIATIION PLAN DEVELOPED; SITE TO BE MONITORED FOR 30 YRS	
<u>VT15-08</u>	FLOWER BROOK, BURKE	SEDIMENTATION; PHYSICAL HABITAT IMPAIRMENT	CT R WQ ASSESSM'T (1994); SOURCES NEED FURTHER ASSESSM'T		DEC-WQ	ON-GOING BIOL MONITOR'G	
VT15-09	MOOSE RIVER BELOW EAST ST. JOHNSBURY VILLAGE	FAILED SEPTIC SYSTEMS AND STRAIGHT PIPES	ASSESSMENT IDENTIFICATION DONE	HOLDING TANKS W/ PUMPOUTS; CONNECTION TO ST. JOHNSBURY WWTF	DEC-ENF; SECTION 319; DEC-PF	DEC 1277 ORDER ISSUED; CALC COSTS TO CONNECT; ANALYSIS OF ALTERNATIVES UNDERWAY	IDENTIFICATION OF FINAL ALTERN 7/94

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VT16-04	UPPER CONNECTICUT RIVER - MOORE RESERVOIR	AGRICULTURAL RUNOFF	CT R WQ ASSESSM'T (1994)		USDA-ACP	ON-GOING (ACP); GRAFTON COUNTY (NH) HAS USDA-HUA	
		WATER LEVEL FLUCTUATION		STABILIZE/REDUCE WATER LEVEL FLUCTUATIONS	FERC LICENSE; NH & VT 401 WQ CERTIFICATION		
VT16-05	UPPER CONNECTICUT RIVER - COMERFORD RESERVOIR	AGRICULTURAL RUNOFF	CT R WQ ASSESSM'T (1994)		USDA-ACP	ON-GOING (ACP); GRAFTON CTY (NH) HAS USDA-HUA	
		WATER LEVEL FLUCTUATION		STABILIZE/REDUCE WATER LEVEL FLUCTUATION	FERC LICENSE; NH & VT 401 WQ CERTIFICATION		
VT16-06	UPPER CONNECTICUT RIVER BELOW COMERFORD DAM	POOR FLOW REGIME	FLOW STUDY NEEDED; IMPACT AREA INVOLVES APPROX. 1 MILE	IMPROVE FLOW REGIME	DEC-WQ; FERC; NEPCo; NH & VT 401 WQ CERTIFICATION	VT ANR NEGOTIATING W/ NEPCo RE: MIN. FLOWS	
	UPPER CONNECTICUT RIVER BELOW McINDOES FALLS DAM	POOR FLOW REGIME	FLOW STUDY NEEDED; PRESENCE OF ENDANG. MUSSELL SPECIES	IMPROVE FLOW REGIME	FERC LICENSE; NH & VT 401 W.Q. CERTIFICATION	VT ANR NEGOTIATING W/ N.E.P.CO RE: MINIMUM FLOWS	
VT16-07	CONNECTICUT RIVER, ABOVE WILDER DAM, BRADFORD	RESERV. WATER LEVEL FLUCTU'N; DESTABIL./ERODING STRMBANKS; IMPACTS TO ARCHEOL.		REDUCE WATER LEVEL FLUCTU'N; STABILIZE STRMBANKS	VT ADCA-DHP; FERC; NEPCo	EXPOSURE & EROSION OF ARCHEOL. FEATURES KNOWN AS 'LONG HOUSES'	
VT16-08L02	WALLACE POND	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION; LAKE ASSOC.		

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<u>VT16-10</u>	EAST BRANCH, NULHEGAN RIVER	SEDIMENTATION; SILVICULTURAL EROSION	CT R WQ ASSESSM'T (1994)	AMPs AVAILABLE FOR NPS CONTROL	VT DFP&R; VTT&PA; DEC-ENF; SECT. 319	N.E. KINGDOM TARGETED FOR LOGGER AMP TRAINING	
<u>VT16-16L01</u>	MILES POND	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		
<u>VT16-19L03</u>	HALLS LAKE (NEWBURY); SURFACE AREA = 84ac	MODERATE EURASIAN WATERMILFOIL INFEST'N; INFEST'N SINCE 1991	ANNUAL SHORELINE SURVEYS	HANDPULLING USED IN PAST AS CTRL METHOD	VT EWMCP, LOCAL EFFORTS	NO BMPs CURRENTLY IN USE (1993)	
<u>VT16-19L03</u>	HALLS LAKE (NEWBURY)	NUISANCE NATIVE WEED AND ALGAE GROWTH, NUTRIENT ENRICHMENT	ASSESSMENT OF NUTRIENT SOURCES NEEDED		DEC-WQ; LAKE ASSOC.	ALGAL BLOOM 1986; ADV. LAY MONITORING SINCE 1980; MECHANICAL WEED HARVESTING	
<u>VT16-20L01</u>	LAKE MOREY (FAIRLEE); SURFACE AREA = 538ac	MODERATE EURASIAN WATERMILFOIL INFEST'N; INFEST'N SINCE 1991			VT MILFOIL CONTROL PROGRAM	LMTD BOTTOM BARRIERS, HANDPULLING, DIVER SUCTION HARVEST'G USED	
<u>VT17-00</u>	LUBBER LAKE	WATER LEVEL FLUCT'N BY HYDRO IMPAIRS LAKE'S AESTHETICS & CAUSES EROSION		REDUCE DRAWDOWN MAGNITUDE	FERC LICENSE & W.Q. CERTIFICATION	LICENSE EXPIRES 1993	LICENSE APP'L TO BE FILED BY 1991

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VT17-01	JOHNS RIVER BELOW CONFLUENCE WITH CRYSTAL BROOK	MANURE PIT FAILURES	DETERMINE NATURE OF PROBLEM - DESIGN, LOCATION, USE	MOVE MANURE PITS OUT OF FLOODPLAIN; IF POSSIBLE BUILD MANURE CONTAINMENT TANKS	USDA-ACP; DEC-ENF; VT EXTENSION; VT DAF&M; DEC-WQ	ON-GOING BIOL. MONITORING ; MANY PUBLIC COMPLAINTS \$\$\$	ON-GOING; UNSCHED.COMPLETION DATES, DEPENDENT ON FED. & PRIVATE \$\$\$
VT17-01L01	LAKE MEMPHREMACOG (NEWPORT)	EXCESSIVE ALGAE GROWTH, NUTRIENT ENRICHMENT	CONTINUED MONITORING OF EFFECTIVENESS OF AG BMPs IN WATERSHED	SCS PL 83-566 PROJECT IN PROGRESS IN BLACK, CLYDE & BARTON RIVER BASINS	USDA-ACP; PL83-566; SECT 319; ADV LAY MONITOR'G SINCE 1985; WRK'G GROUP (1991)	BLK R START '82 W/ 42 CONTRACTS; B/C START '87 W/ 43 CONTRACTS; 30 INCOMP CNRTS	WRK'G GRP RECOM (1993); W/SHED ASSOC EST 1994; LINK 319 & 566 \$\$\$ ('94)
		LIGHT EURASIAN MILFOIL INFEST'N; SINCE 1980s	CONT'D EVAL OF MILFOIL CTRL OPTIONS, HERBIV. RES. PROJ., CONSIDER RARE FLT SPEC.		US EPA; ANCF & EWMCP, ; MORE \$\$\$ NEEDED TO EVAL/IMPL BEST CTRL METHODS	BOTTOM BARRIERS IN USE AS PARTIAL CTRL; WEEVIL PRESENT	US EPA RESEARCH PROJECT TO BE DONE 1995
VT17-01L02	SOUTH BAY - LAKE MEMPHREMACOG	EURASIAN MILFOIL INFESTATION; SEE ALSO VT17-01L01	HERBIVORE RESEARCH PROJECT, EVAL OF MILFOIL CTRL OPTIONS		US EPA; ANCF & EWMCP; MORE \$\$\$ NEEDED TO EVAL/IMPL BEST CTRL OPTIONS		HERBIVORE RESEARCH PROJECT TO BE DONE 1995
		NUTRIENT ENRICHMENT, NUISANCE ALGAL GROWTH		CONTROL/REDUCE AGRICULTUAL RUNOFF	USDA PL83-566; -ACP; SECTION 319	PL83-566 & ACP ON-GOING; LINK 319 & 566 ('94)	
VT17-03	AVERILL CREEK DOWNSTREAM FROM DAM ON GREAT AVERILL LAKE	POOR FLOW REGIME	FLOW STUDY NEEDED	IMPROVE FLOW REGIME	10 VSA SECTION 1003 CONFERENCE	UNLICENSED STATUS UNDER FERC REVIEW	
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	NEEDS ASSESSMENT	MEASURES TO PREVENT IMPINGEMENT AND ENTRAINMENT AND ALLOW FOR PASSAGE	VDF&W; DEC-WQ	AS ABOVE	

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Waterbody ID	Segment	Problem(s) & Impairment(s)	Assessment Needed	BMP Needed	Program/Funds	Current Status	Schedule - 1994 303(d) ranking
VT17-03	AVERILL CREEK DOWNSTREAM FROM DAM ON LITTLE AVERILL LAKE	POOR FLOW REGIME	FLOW STUDY NEEDED	IMPROVE FLOW REGIME	10 VSA SECTION 1003 CONFERENCE	UNLICENSED STATUS UNDER FERC REVIEW	
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	ASSESSMENT NEEDED	MEASURES TO PREVENT IMPINGEMENT AND ENTRAINMENT AND ALLOW FOR PASSAGE	10 VSA, SECTION 1003 CONFERENCE	AS ABOVE	
	COATICOOK RIVER - NORTON	HAZARDOUS WASTE SPILL W/ SURF WATER IMPACT			DEC-HMM; PETROLEUM CLEANUP FUND; RESPONSIBLE PARTIES; US BORDER SERVICE	UNDER 10 VSA 1941 MGMT; UST CONTAM'N; INVEST'N PENDING	SITE #911099
VT17-03L01	LITTLE AVERILL LAKE	POOR FLOW REGIME	FLOW STUDY NEEDED	IMPROVE FLOW REGIME	10 VSA SECTION 1003 CONFERENCE	UNLICENSED STATUS UNDER FERC REVIEW	
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	ASSESSMENT NEEDED	MEASURES TO PREVENT IMPINGEMENT AND ENTRAINMENT AND ALLOW FOR PASSAGE	ANR - FISH & WILDLIFE, DEC - WATER QUALITY	AS ABOVE	
VT17-03L01	LITTLE AVERILL LAKE	WATER LEVEL FLUCT'N BY HYDRO IMPAIRS LAKE'S FISHERY, RECREATION & ENDANGERED SP.	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT	REDUCE DRAWDOWN MAGNITUDE	10 VSA SECTION 1003 CONF.; ANR-DF&W, DEC- WQ	UNLICENSED HYDRO STATUS UNDER FERC REVIEW	
VT17-03L02	GREAT AVERILL LAKE	WATER LEVEL FLUCT'N BY HYDRO IMPAIRS LAKE'S FISHERY, RECREATION & ENDANGERED SP.	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT	REDUCE DRAWDOWN MAGNITUDE	10 VSA SECTION 1003 CONF.; ANR-DF&W, DEC- WQ	UNLICENSED HYDRO STATUS UNDER FERC REVIEW	
VT17-03L05	NORTON POND	H2O LEVEL FLUCT'N BY HYDRO IMPAIRS LAKE'S FISHERY, RECR., AESTHETIC S, ENDANG. SP.	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT	REDUCE DRAWDOWN MAGNITUDE	10 VSA SECTION 1003 CONF.; ANR-DF&W, DEC- WQ	UNLICENSED HYDRO STATUS UNDER FERC REVIEW	

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VT17-04	LOWER CLYDE RIVER BELOW NEWPORT #11 HYDRO DAM	POOR FLOW REGIME	FISHERIES FLOW NEEDS ASSESSMENT DONE	IMPROVE FLOW REGIME	FERC LICENSE & W.Q. CERTIFICATION	FFNA COMPLETE IN 1980; LICENSE EXP. 1993	LICENSE APPL'N FILED BY 12/91
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	ASSESSMENT DONE	MEASURES TO PREVENT IMPINGEMENT AND ENTRAINMENT AND ALLOW FOR PASSAGE	AS ABOVE	LICENSE EXPIRES 1993; PROPOSING TRAP-&-TRUCK	AS ABOVE
	LOWER CLYDE RIVER BELOW NEWPORT HYDRO DAM	POOR FLOW REGIME	FLOW STUDY NEEDED	IMPROVE FLOW REGIME	FERC LICENSE & W.Q. CERTIFICATION	LICENSE EXPIRES 1993	LICENSE APPL'N FILED 12/91
		POSSIBLE FISH PASSAGE PROBLEM AT DAM	ASSESSMENT DONE	MEASURES TO PREVENT IMPINGEMENT AND ENTRAINMENT AND ALLOW FOR PASSAGE	LICENSE EXPIRES 1993; PROPOSING TRAP-&-TRUCK	LICENSE EXPIRES 1993	
		LOWER CLYDE RIVER BELOW WEST CHARLESTON HYDRO DAM	POOR FLOW REGIME	FISHERIES FLOW NEEDS STUDY DONE	IMPROVE FLOW REGIME	FERC LICENSE & W.Q. CERTIFICATION	LICENSE EXP. 1993
		POSSIBLE DOWNSTREAM FISH PASSAGE PROBLEM AT DAM	ASSESSMENT NEEDED	MEASURES TO PREVENT IMPINGEMENT AND ENTRAINMENT AND ALLOW FOR PASSAGE	AS ABOVE	LICENSE EXPIRES 1993	AS ABOVE
		VT17-04,05	CLYDE RIVER FROM ISLAND POND TO MOUTH	AGRICULTURAL RUNOFF, HIGH FECAL COLIFORM COUNTS IN WATER	PRELIMINARY INVESTIGATION & WATERSHED PLAN 1986; SMALL WATERSHED ASSESS. 1983	BARNYARD AND MILKHOUSE WASTE STORAGE FACILITIES, CONSERVATION CROPPING PRACTICES	USDA-ACP; PL83-566 (BARTON & CLYDE W/SHEDS); SECT 319
VT17-04L04	LAKE SALEM (SALEM POND)	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION; LAKE ASSOC.		
VT17-04L05	LAKE DERBY	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		

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VT17-04L06	CLYDE POND	WATER LEVEL FLUCT'N IMPAIRS AESTHETICS, WETLAND, FISHERIES, WILDLIFE HABITAT		REDUCE DRAWDOWN MAGNITUDE	FERC LICENSE & W.Q. CERTIFICATION	LICENSE EXPIRES 1993	LICENSE APPL'N FILED 12/91
VT17-05L05	SEYMOUR LAKE	WATER LEVEL FLUCT'N BY HYDRO IMPAIRS LAKE'S FISHERY	NEED ASSESSMENT OF FISHERY HABITAT REQ'MT; PRESENCE OF RARE AQUATIC PLANT SP.	STABILIZE WATER LEVELS	FERC LICENSE & W.Q. CERTIFICATION	LICENSE EXPIRES 1993	LICENSE APPL'N FILED 12/91
VT17-05L06	ECHO LAKE	WATER LEVEL FLUCT'N BY HYDRO IMPAIRS LAKE'S FISHERY	FURTHER ASSESSMENT OF FISHERY HABITAT REQUIREMENT	STABILIZE WATER LEVELS	FERC LICENSE & W.Q. CERTIFICATION	LICENSE EXPIRES 1993	LICENSE APPL'N FILED 12/91
VT17-06L02	LAKE WILLOUGHBY (WESTMORE)	HEAVY NATIVE WEED GROWTH IN ONE LOCATION IN LAKE, NUTRIENT ENRICHMENT	PRESUMED AGRICULTURAL WASTE MIS-MGMT	AG WASTE MGMT (STORAGE & APPL'N)	USDA-ACP; LAKE ASSOC.	ON-GOING (ACP); BARNYARD CONTROLS INSTALLED; LEGAL ACTION TAKEN	ADV. LAY MONITORING ('80-'86); BASIC LAY MONITOR. ('87-'91)
VT17-07	BARTON RIVER FROM VILLAGE OF ORLEANS TO MOUTH	AGRICULTURAL RUNOFF	PRELIMINARY INVESTIGATION AND WATERSHED PLAN 1986; SMALL WATERSHED ASSESS. 1983	BARNYARD, MILKHOUSE WASTE STORAGE FACILITIES, CONSERVATION CROPPING SYSTEMS	USDA-ACP; PL83-566; SECT 319	566 START 1987; SEE VT17-04,05	PL-566 DONE ('97); ON-GOING (ACP); LINK 319 & 566 ('94)
VT17-08L02	LAKE DANIELS	NUTRIENT ENRICHMENT, SEDIMENTATION, NATIVE PLANT & ALGAE GROWTH	SOURCES NEED FURTHER ASSESSMENT		DEC-WQ LAKE PROTECTION		

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<u>VT17-08L06</u>	LAKE PARKER	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION; LAKE ASSOC.	RECV'D WATERSHED SURVEY	
<u>VT17-09</u>	BLACK RIVER IRASBURG/ALBANY TOWN LINE TO MOUTH	AGRICULTURAL RUNOFF	PRELIMINARY INVESTIGATION AND WATERSHED PLAN 1982	INSTALL WASTE MANAG. SYSTEMS, CONSERVATION CROPPING PRACTICES	USDA-ACP; PL83-566; SECT 319	566 START 9/82; 54/100 W/SHED FARMS CONTRACTED ; 42/54 CONTR INSTAL'D	566 DONE ('94?); ON-GOING (ACP); LINK 319 & 566 ('94)
	BLACK RIVER, MOUTH TO LORDS CREEK	WASTE USA LANDFILL ABUTS WETLAND; LEACHATE ENTERING SURFACE WATER	WAS HI-THREAT IN '89; POSSIBLE CONTAM'N INCL GRD & SURF WATER & AQ. BIOTA		CERCLA; DEC-SW; DEC-WQ	SITE INSPEC'N '88; SURF WATER SAMPL'G & FINAL NUS SSI REPORT '89; UNLINED	FORMERLY NADEAU LANDFILL; DISCONT'D RECV'G WASTE 10/92; SITE #770009
<u>VT17-10</u>	BLACK RIVER, FROM IRASBURG/ALBANY TOWN LINE TO HEADWATERS	AGRICULTURAL RUNOFF	PRELIMINARY INVESTIGATION AND WATERSHED PLAN 1982	INSTALL WASTE MANAGEMENT SYSTEMS, CONSERVATION CROPPING PRACTICES	PL83-566; USDA-ACP; SECT 319	BEGUN 9/82; SEE VT17-09	
<u>VT17-10L02</u>	MUD POND - CRAFTSBURY	NUTRIENT ENRICHMENT	NEEDS FURTHER ASSESSMENT RE: SOURCES		DEC-WQ LAKE PROTECTION		

APPENDIX F

Municipal Water Pollution Control Project Priority System

Effective November 1, 1988

AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

10-1630 MUNICIPAL POLLUTION CONTROL PRIORITY SYSTEM

Section 1.0 PURPOSE

This priority system establishes procedures to determine which Publicly Owned Treatment Works (POIW) projects will be awarded grant or loan funds from allotments made available to the Agency of Natural Resources from federal or state funds.

Section 2.0 INTRODUCTION

This priority system is comprised of 1) priority list management procedures, and 2) project rating criteria. Priority list management procedures define the steps to be taken to develop and revise the priority list annually. These steps are described below.

Section 3.0 ANNUAL PRIORITY LIST DEVELOPMENT

Each year, prior to the beginning of the state fiscal year, the Department will prepare a project priority list. This document will list all projects potentially fundable from grant programs or the revolving loan program over the next five (5) year period. In addition, this list will separately identify those projects expected to be funded in the upcoming fiscal year.

The following concepts will be utilized in the list preparation:

- A. All steps of a project will be identified separately in the list, including Step I and Step II phases.
- B. Sufficient projects will be scheduled to be funded in the upcoming fiscal year to use all of the anticipated state and federal funds in the grants program and the revolving loan program.
- C. Projects will be listed in priority order in groupings which reflect the funding authorizations to be used. For example CSO projects would be grouped separately since all would be funded pursuant to 10 V.S.A. section 1624a, while construction of new or upgraded sewage treatment plants undertaken for purposes of meeting water quality standards during dry weather flow would be grouped separately and funded pursuant to 10 V.S.A. section 1625.
- D. Projects will be scheduled to receive funds on the first year (fundable) portion of the list, either from grants or loan funds, based on their priority point rating. The projects placed on the fundable portion of the list will remain on the fundable list until the 1st day of January following the beginning of the state fiscal year for which the list is adopted. The priority list will be amended annually following January 1st to remove projects

on the fundable portion of the list which have not submitted an approvable grant/loan application. Those projects may be shifted to the following fiscal year and replaced by the next highest priority rating project which has submitted an approvable Step III funding application, together with all requisite attachments and approvals.

- E. The Step I and Step II projects necessary to support the selected Step III projects will be scheduled, as appropriate, in earlier fiscal years.
- F. The list will contain all information required by state and federal statute or regulation.

The Department will seek public comment on the proposed project list by a) direct mailing to municipalities, organizations and interested individuals and, b) conducting a formal public hearing. The notice of the hearing will be State-wide, published in at least two (2) newspapers having general circulation in the state, and indicate the location(s) where copies of this priority system and the priority list may be viewed by interested persons prior to this hearing. The notice will be published at least 30 days in advance of the public hearing. As a minimum, the system and draft list will be available at the Department of Environmental Conservation's main office. In addition, a copy of this priority system and the draft listed will be sent to each municipality with a proposed publicly owned treatment works (POTW) project. The notice will solicit comment from any interested person at any time until seven (7) days following the end of the public hearing.

The Department will respond to any comments received through the close of the comment period and, where appropriate, make changes in the proposed list. A summary of public comments and Department responses will be sent to all municipalities and interested persons originally receiving notice of the hearing, and to any other interested persons. The Department will officially adopt the priority list at this time and any necessary documents or information will be sent to EPA.

Section 4.0 ANNUAL PRIORITY LIST AMENDMENT AND REVISION

- A. The Department may periodically evaluate the project priority list to determine if amendments are necessary to add or delete projects from the fundable list in response to unanticipated project cost increases, project schedule delays, increased or decreased available funds or other factors. The Department may propose an amendment based upon this evaluation.
- B. Notice of proposed amendments to the priority list will be sent to all municipalities, organizations and person on the mailing list. This notice will clearly show the proposed changes to the list, along with the reasons for the proposed changes. All parties will be given a fourteen (14) day period from the time the notice is mailed to comment on the proposed changes. If two or more municipalities request a public hearing on the proposed change, the Department will warn and hold such a hearing. This hearing will be warned in the same manner as the original public hearing, except that the warning period will be for fourteen

Category IIIA Water Quality Limited Discharges
Dissolved Oxygen Consuming
Pollutants

A project which eliminates a substandard discharge or a CSO discharge to a segment of water designated as a water quality limited segment pursuant to Section 303(d)(1)(A) of the Clean Water Act, and where such designation is based upon the sensitivity of the receiving water to dissolved oxygen consuming pollutants, or where the Department has determined that phosphorus removal is required to preserve water quality, shall receive six (6) points.

Category IIIB Water Quality Limited Discharges
Existing Violations or Phosphorus

A project which will eliminate a substandard or CSO discharge to a water quality limited segment as defined by Section 303(d)(1)(A) of the Clean Water Act, and where current discharges to those water are determined by the Department to cause present violation of dissolved oxygen water quality standards at 7Q10 flow, or where the Department has determined that phosphorus must be removed from those discharges to preserve water quality, shall receive three (3) priority points.

Category IVA Combined Sewer Overflows Lakes and Ponds

A project which will eliminate combined sewer overflows by treatment or separation of sanitary sewers where such overflows discharge directly to or just upstream of a lake or pond shall receive six (6) priority points.

Category IVB Combined Sewer Overflows - Streams

A project which will eliminate or treat existing combined sewer overflows, to rivers or streams, shall receive four (4) points.

Category VA Raw Sewage Discharges - Treatment Plants

Projects which will eliminate existing raw sewage discharges to surface waters of the state through the construction of new sewage treatment plants shall receive seven (7) points.

Category VB Raw Sewage Discharges - Treatment Plants

Sewer extension projects which eliminate raw sewage discharges will receive three (3) points, if at least 20% of the existing units to be served are confirmed by the Department to be defined points of pollution reaching the surface waters of the state.

Category VI Primary Treated Discharges

Projects which will eliminate an existing primary treated discharge to surface waters of the State, or which provide improvement that the Department has determined are necessary to allow that plant to meet its effluent limits shall receive six (6) points.

(14) days. If no hearing is required the Department will consider all public comment received, revise the proposal if necessary, and adopt the amendment. A copy of the adopted amendment, along with a public responsiveness summary discussing the comments received, will be sent to all parties on the mailing list.

- C. The Department may make clerical corrections to the list, remove projects which have received funding, and add Step I or Step II projects to the fundable list to use excess funds without following the public notification procedures outlined in (B) above.

Section 5.0 PROJECT RATING SYSTEM

- A. The project rating system shall establish the point ratings for all projects on the State project priority list. The point rating system is intended to evaluate the proposed project's impact on surface water quality, public use of the waters of the State, potential significant public health hazards, and municipalities' needs for POTW improvements. The priority system established rating points for thirteen (13) different categories. These categories define the impacts on surface water quality and public health, and consider other areas as required by 24 VSA Chapter 120. The criteria used by the Department to assign priority points are discussed below.

Category I Grant Eligible Projects

All projects which qualify for State or Federal construction grants or loans shall receive one (1) priority point.

Category II Public Health Hazards

A project which in the department determination eliminates a significant public health hazard shall receive five (5) points. A significant public health hazard shall be identified by the following factors:

1. The health hazard shall be declared in writing by formal action of the local health officer or the State Department of Health, and
2. The health hazard shall originate from industrial or domestic waste, and
3. The health hazard declaration must require that interim corrective measures be taken to minimize the hazard until the project is completed. Interim corrective measures might consist of, but are not limited to, pumping and hauling of sewage to remote disposal, fencing to restrict public access to school playgrounds, recreational areas and commercial areas, restriction of use or boil water orders on public/private water supplies drawn from surface waters downstream of the sewage discharge, and closing of public swimming beaches or areas.

Category VII Health and Welfare

1. Projects which eliminate pollution to defined swimming areas shall receive two (2) priority points.
2. Projects which restore a water use not available because of existing pollution shall receive the following points:
 - a. Restore fishing - one (1) point
 - b. Restore other use approved by the Department - one (1) point
3. Projects which abate existing failing septic systems that do not cause direct pollution of state waters shall receive two (2) points.

Category VIII Population Affected

A project shall receive priority points equal to the Log (Base 10) of the population of the municipality sponsoring the project. For regional projects the total population in the participating municipalities will be used.

Category IX Cost of Comparable Credit

Projects will receive priority points equal to the total project cost divided by the population and expressed as a percentage of the median household income.

Category X Benefit - Cost Ratio

Projects will be granted priority points in this category equal to the sum of the project's priority points from Categories II thru VII, divided by the estimated total cost of the proposed project (In hundreds of thousands of dollars).

- B. Computations of Rating - A project may receive points in each category of categories I through IVB but may only receive points in one category from categories VA through VI. Projects which upgrade existing treatment plants to a state or federally required higher level of treatment will not receive Category VA or VB points for the simultaneous abatement of scattered individual pollution sources. A project at an existing treatment plant, which the Department determines is necessary to allow that plant to meet its effluent limits, will receive points in Category VI. Examples of such projects would be the addition of necessary sludge storage, treatment or disposal facilities either at the sewage treatment plant or centralized at a regional sludge management facility, or the addition of necessary dechlorination equipment. CSO projects may qualify for category IIIA and B points.

The project priority rating is the total of the points from each applicable category. The point total establishes the overall priority of the project. All components of a regional project shall receive the same number of points as the highest rated

component of the regional project. Each year, prior to the publication of the proposed list, the rating for each project will be re-evaluated to assure the points assigned to each project are still valid. Necessary priority point adjustments will be made at this time. All steps and segments of a project will have the same priority rating.

- C. Projects with equal priority points ratings will, from time to time, be ready to receive project funding within the same fiscal year, and a determination must be made as to which project shall be funded from limited available funds. Those determinations shall be made in the following manner:
1. Projects which have been credited with health hazard points shall be funded first.
 2. Projects which are a remaining component of a regional project shall be funded second where the first component of the regional project has initiated construction. Where decisions are necessary to determine which portion of ready to proceed, segmented or regional projects will be funded first, the Department will fund the treatment plant portion of these projects ahead of the sewer line construction. Where choices must be made between sewer construction portions of such projects, the Department will fund the first project which has submitted an approvable grant application.
 3. Projects which discharge to lakes or ponds will be funded third.
 4. Projects remaining after the above determinations have been made shall be funded based upon the first to submit an approvable grant or loan application with all requisite attachments and approvals.
- D. Funds available in the State Pollution Control Revolving Loan Funds will be first used to finance priority projects which are ready to proceed to construction or which are ready to initiate engineering studies. If unused monies are available in these funds after all projects which are anticipated to be ready to proceed in the current fiscal year have been placed on the priority list, the Department will use these funds for purposes enumerated in 24 VSA 4757.

Section 6.0 DEFINITIONS

- A. "Approvable Grant or Loan Application" shall mean a Federal and State grant or loan application including all requisite certifications, attachments, assurances, permits, plans and specifications approved by the Department, and evidence of a valid local bond vote authorizing adequate local funds for the project.
- B. "Substandard Discharge" shall mean any discharge of pollutants which do not meet State or Federal statutory discharge limits or which have been determined by the Department to result in violations of instream water quality standards.

- C. "Regional Projects" shall mean those projects where more than one municipality have agreed to jointly treat sewage, sludge, or septage from at least a portion of their respective municipalities. The project must serve a substantial portion of the any municipality where only sewers are to be constructed and the interconnection must be an identified alternative to construction an additional treatment facility. All components of the regional project must be projects eligible for State water pollution abatement funds. Before the Department can accept projects as a regional system, and acceptable intermunicipal agreement must be signed by the municipalities involved, or the project applicant must be multimunicipal Fire District, Consolidate Sewer District, or Solid Waste District created under authority of Vermont Statutes.
- D. "Ready to Proceed" shall mean the submission, to the Department, of an approvable grant or loan application.
- E. "Primary Treatment" shall mean any treatment system in use by a municipality which does not achieve an effluent quality consistent with the Federal EPA definition of secondary treatment found in 40 CFR 133.105.
- F. "POTW or Publicly Owned Treatment Works" shall mean all sewage collecting systems, pump stations and other approved methods of sewage conveyance, all treatment works including storage and disposal systems, and all sludge handling and disposal systems, which are owned by a legally constituted municipality in the State of Vermont.
- G. "State or Federal Grant or Loan Funds" shall mean all funds appropriated by the Vermont Legislature to be used by the Department under the Pollution Control Grant program under 10 VSA Chapter 55, or the Water Pollution Control Revolving Loan Fund, 24 VSA Chapter 120; or from appropriations made by the Federal Government for pollution control grants or loans under the Clean Water Act.
- H. "MFI" shall mean the Median Family Income as defined by the United States Census Bureau for the municipality in question.

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APPENDIX G

Wasteload Allocation Process

WASTELOAD ALLOCATION PROCESS

AGENCY OF ENVIRONMENTAL CONSERVATION

September, 1987

PURPOSE

The State of Vermont has established Water Quality Standards as a means of guiding the management of water quality to ensure the use and enjoyment of Vermont's lakes and streams. Typical uses may include fishing, swimming, boating, hydroelectric power generation and waste disposal. When a use such as waste disposal threatens to degrade water quality to the extent that other uses are impaired, a limit must be placed upon the quantity of waste that may be discharged. This limit, referred to as the assimilative capacity, is defined as the maximum quantity of waste the water body can accept, without water quality being degraded below established standards.

In the case of multiple waste discharges to the same water body, a process is needed by which the available capacity which exists to assimilate wastes can be divided among the various dischargers.

To stipulate how Federal and State mandated wasteload allocations should be made, the Department of Environmental Conservation first developed a Wasteload Allocation Process in 1978. This revised Wasteload Allocation Process describes how the Department makes such wasteload allocations among competing dischargers and how the allocation is implemented in the State and Federal wastewater discharge programs.

WASTELOAD ALLOCATION PROCESS

DEFINITIONS

As used in this rule, the following definitions shall apply:

ASSIMILATIVE CAPACITY - The measure of a water body's ability to accept wasteloads without degrading water quality below established water quality standards.

DEPARTMENT - The Department of Environmental Conservation.

EFFLUENT LIMITED - Rivers, streams and lakes which will meet applicable water quality standards when minimum waste discharge effluent limitations are applied to all dischargers.

EXISTING DISCHARGE - Any discharge or activity to the extent authorized by a valid permit issued under the provisions of 10 V.S.A. Section 1263 or Section 1265 as of the date of adoption of these rules.

NEW DISCHARGE - Any discharge not authorized under the provisions of 10 V.S.A. Section 1263 as of the date of adoption of these rules, or any increased pollutant loading or demand on the assimilative capacity of the receiving waters from an existing discharge which requires the issuance of a new or amended permit.

NONPOINT SOURCE POLLUTION - Pollution resulting not from a point source, such as an outfall pipe of a sewage treatment plant, but rather from diffuse or distributed sources such as overland runoff from construction areas, agricultural lands, forest lands, or groundwater-borne pollutants, such as leachate from sanitary landfills.

PUBLICLY OWNED TREATMENT WORKS (POTW) - Any government-owned device or system used in the storage, treatment, disposal or recycling of wastes.

SECONDARY TREATMENT - A wastewater treatment process, usually biological, which is designed to reduce oxygen demanding materials in the effluent.

SECRETARY - The Secretary of the Agency of Natural Resources or his authorized representative.

SEVEN-DAY LOW FLOW, TEN-YEAR RETURN PERIOD (7Q10) - A statistical measure of the magnitude and frequency of low flow in a river. It is the lowest mean flow for seven consecutive days, which has a 10% chance of occurring in any given year.

SUBALLOCATION - The redistribution of a discharger's wasteload allocation by that discharger to another discharger.

TOTAL MAXIMUM DAILY LOAD (TMDL) - The total allowable amount of pollutant which a discharger is allowed to discharge to a water body per day which will ensure water quality standards are met.

WASTELOAD ALLOCATION - The distribution of maximum allowable daily loads to dischargers, the sum of which will meet the assimilative capacity of a particular reach of river or stream.

WATER QUALITY LIMITED - Rivers, streams, and lakes, or portions of them, where existing or proposed discharge loads exceed the assimilative capacity of the water body even after all discharges meet minimum effluent standards. These minimum standards specify best practicable treatment by private discharges and secondary treatment by municipalities.

WATER QUALITY STANDARDS - Rules titled "Vermont Water Quality Standards", adopted by the Water Resources Board.

WASTELOAD ALLOCATION PROCESS

Procedures for Estimating Assimilative Capacity

To provide a fair distribution of waste assimilation capacity among all dischargers in a water segment, the use of mathematical simulation modeling should first be employed to determine the assimilative capacity of the receiving water.

All discharges that significantly impact the resource, based on considerations of frequency and/or magnitude, shall be included in such assimilative capacity determinations. These discharges shall include, but not be limited to, municipal and industrial discharges, nonpoint sources, stormwater runoff and combined sewer overflows. All discharges used in the modeling process will be characterized by total maximum daily loads.

It is recognized that seasonal variations in temperature and biological activity occur, and the waste assimilation capacity of water segments may be calculated on a seasonal basis. This should be based upon temperature, reaction rates, aquatic plant photosynthesis and respiration, 7Q10 flow, and non-point source inputs that are consistent with the season in question.

Development and Adoption of a Wasteload Allocation

The process for allocating the assimilative capacity of a particular water segment to a discharger or among competing dischargers in the segment shall be based upon the following guiding priorities:

- I. Providing maximum protection of the water resource.
- II. Ensuring equity among existing dischargers.
- III. Allowing comparable capacity for future growth.
- IV. Maximizing the benefit/cost ratio of the allocation.
- V. Minimizing the number of Wastewater Treatment Facilities discharging to the State's waters.

1. The process for making a wasteload allocation, as set forth in the following paragraphs, shall not commence prior to notification by the Secretary of the initiation of such action. The Secretary shall cause such notice to be published in a newspaper having general circulation in the affected area and shall notify by direct mailing all affected municipalities, industries, dischargers, regional planning commissions, and other interested parties.

2. Wasteload allocations will be developed using the provisions of this process and adopted by the Secretary for all affected segments, when the Department estimates that existing or projected wasteloads exceed the assimilative capacity of the water segment, or when deemed necessary by the Secretary. Wasteload allocations may be made whether or not the water segment has been formally designated as water quality limited.

3. When the Secretary determines particular conditions warrant its consideration, any water quality parameter may be the subject of a wasteload allocation.

4. Based upon assimilative capacity modeling, a minimum of three wasteload allocation alternatives will be prepared by the Department. Alternatives will include:

a. Uniform effluent concentration limitations for all dischargers within the segment, with total maximum daily loads (TMDL) based on treatment plant design flow projections.

b. TMDL allocations for each discharger based on existing and projected populations or population equivalents.

c. Requiring best practical wastewater treatment for all dischargers within the reach. Then selectively increasing the required treatment level for facilities with the greatest impact on the receiving water due to size or location, until water quality standards are attained.

5. To develop wasteload allocation alternatives and determine projected populations and wastewater flows, town officials, regional planning commissions, private dischargers and the State Office of Policy Research and Coordination will be consulted. Town plans, zoning ordinances, capital investment plans and regional plans will also be considered in developing alternative wasteload allocations.

6. Other wasteload allocations which appear to be reasonable in the judgement of the Secretary for the situation under consideration may be prepared, including seasonal wasteload allocations.

7. The capacity of the waters of the State to assimilate both the discharge of wastes and the impact of other activities which may adversely affect water quality, and at the same time to maintain a level of water quality which is compatible with their classification, is finite. A portion of the assimilative capacity may be held in reserve to provide for future needs, including the abatement of future sources of pollution and future social and economic development.

8. Where proposed discharges or projected growth precipitates the need for a wasteload allocation, the Secretary may require an assimilative capacity determination to be prepared by those proposing to discharge.

9. Informational materials to explain each of the alternatives will be prepared for use at public meetings and hearings and for the interested public at large. This material will also provide information on the rationale for and implication of each of the alternatives with a statement specifying which one is preferred by the Department and why.

10. A minimum of one public meeting will be held for each wasteload allocation at a convenient location in the river basin. It will be a public informational meeting to explain the wasteload allocation proposed by the Department and the other alternatives. Comments and concerns regarding the proposed wasteload allocation will be recorded and considered by the Department their resolution will be presented to the Secretary of the Agency. If deemed necessary, additional public meetings will be scheduled.

11. Suballocation of assimilative capacity by an endowed party to either new dischargers or other existing dischargers will not be allowed. The Secretary may reallocate the assimilative capacity at the request of an endowed party through the use of this Process. This will not affect a discharger's ability to control connections onto their permitted treatment facility, but will prevent the creation of new discharges or increasing of other existing discharges through redistribution of an allocation.

12. The wasteload allocation is included as part of the State Water Quality Management Plan and will be implemented through the NPDES permit process, using maximum daily effluent limits, as determined by the assimilative capacity analysis and set forth in the wasteload allocation.

13. The Secretary will initiate a review of adopted wasteload allocations whenever such a review becomes necessary. The Secretary will also consider petitions requesting amendment of a wasteload allocation. Whether an amendment is considered upon the initiative of the Secretary or by petition, the disposition of the proposal shall be within the sound judgement of the Secretary.

14. Appeals of the wasteload allocation will be to the Water Resources Board per 10 V.S.A. 1269. Affected parties may appeal an allocation within thirty (30) days of its adoption.

APPENDIX H

Interagency Ground Water Management Plan

INTERAGENCY GROUND WATER MANAGEMENT PLAN
A Strategy for protecting Vermont's ground water

Department of Agriculture, Food & Markets
Agency of Human Services
Agency of Natural Resources
Agency of Transportation

Adopted: May 1, 1991

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Preface:

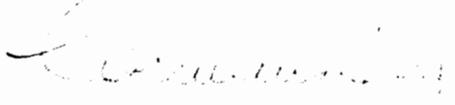
This document is a statewide, interagency coordinated plan (strategy) which describes major interagency ground water issues, goals and objectives by which the State of Vermont will protect its ground water resources. It does not negate or detract from other duly adopted Rules, Strategies and plans, but rather supplements those strategies by coordinating the signatory agencies' programs to protect ground water under their respective authorities.

Agreement:

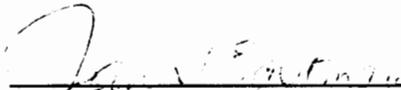
We, the undersigned, hereby adopt this document as Vermont's Interagency Ground Water Management Plan and agree to pursue those goals and objectives set forth herein as are consistent with our respective statutory mandates and missions.



George M. Dunsmore, Commissioner of
Agriculture, Food and Markets



Cornelius D. Hogan, Secretary of
Human Services



Jan S. Eastman, Secretary of
Natural Resources



Patrick J. Garahan, Secretary of
Transportation

Interagency Ground Water Management Plan

Chapter I

INTRODUCTION

Ground Water is the primary source of drinking water for over 60% of Vermont's residents. This dependency is protected by the state's statutory policy which is as follows:

"It is the policy of the State of Vermont that it shall protect its ground water resources to maintain high quality drinking water and shall manage its ground water resources to minimize the risks of ground water quality deterioration by limiting human activities that present unreasonable risks to the use classifications of ground water in the vicinities of such activities while balancing the state's ground water policy with the need to maintain and promote a healthy and prosperous agricultural community."¹

To implement this policy, the Agency of Natural Resources developed a Ground Water Protection Rule and Strategy which was adopted in 1988. The Strategy directs the Agency of Natural Resources in managing and protecting ground water and serves as guidance to other state and local agencies in the development of ground water protection programs.

¹ Title 10 Vermont Statutes Annotated, Chapter 48 Ground Water Protection, Sub Chapter 1, Section 1390 Policy.

The weakness of that strategy is that it does not include goals or objectives for agencies, other than Natural Resources, which also have programs affecting ground water. This plan brings together all the appropriate state agencies to effect a statewide ground water protection program.

The purpose of the Interagency Ground Water Management Plan (The Plan) is to direct the comprehensive resource protection efforts of all state agencies, departments and divisions having either direct or indirect responsibilities for ground water management. The Plan complies with the policy and directives of 10 VSA Chapter 48 Ground Water Protection and Chapter 12 (DEC) Ground Water Protection Rule and Strategy and with the appropriate provisions of the Federal Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA) which provide for ground water protection.

The Plan is part of a larger, long range State Clean Water Strategy (SCWS) required by the Federal Water Quality Act of 1987. By this legislation, states were directed to identify, assess and develop strategies to address sources of water pollution and the water resources which they threaten. The Inter-Agency Ground Water Management Plan (The Plan) is an appendix to the SCWS.

The Plan includes discussions and assessments of major ground water resource issues and identifies the state agencies which deal with them. Issues include the lack of a comprehensive data base for contamination sources, the absence of aquifer mapping and gaps in protection programs. Priority Goals and objectives are set out by issue and agency responsibility.

The goals and objectives of this plan are to direct the various programs as they are conducted from year to year under annual work plans. Goals are relatively long term (5 to 15 years) and objectives generally short term (1 to 3 years). The time frames (milestones) to meet the goals and objectives are flexible to accommodate the availability of funding and other resources.

Priorities:

The issue of priorities among the various issues, goals and objectiveness set out in this document will be largely resolved by the respective lead agencies within the constraints of their legislatively mandated programs, funding and staffing resources. To the extent that interagency priorities need to be established it is expected that the signatory offices will provide that direction through Memoranda of Agreement (MOA).

ACKNOWLEDGMENTS

The following Federal and State agencies, divisions and departments contributed to the development of this INTERAGENCY GROUND WATER MANAGEMENT PLAN.

- US Environmental Protection Agency, Region I, Boston
- University of Vermont, School of Natural Resources
- University of Vermont Extension Service
- State Office of Policy Research and Coordination
- State Agency of Development and Community Affairs
- State Agency of Transportation
- State Department of Health (Agency of Human Services)

- State Department of Agriculture, Food and Markets
- State Agency of Natural Resources Planning Division
- State Department of Environmental Conservation
 - Protection Division
 - Hazardous Materials Management Division
 - Solid Waste Management Division
 - Water Quality Division
 - Public Facilities Division
- State Div. of Geology and Mineral Resources

The preparation of this document was financed in part by funds received from the U.S. Environmental Protection Agency under Section 106, of the Clean Water Act.

Federal Policy/State Role

During the past few years national environmental policy has shifted more resource management responsibility to the states. The primary goal of this policy is to build and enhance resource protection capability at the state level so that over time resource protection activities will have less reliance on the federal government. The federal role therefore is primarily to provide technical assistance and program oversight to ensure national program consistency. The state's role is to protect the resource for present and future uses as a source of high quality drinking water by regulating and managing potentially contaminating activities and by educating the public to understand and protect its ground water.

I. COORDINATION

A. Discussion

The primary thrust of this Interagency Ground Water Management Plan is to provide one statewide coordinated approach to ground water protection despite the number of agencies operating separate programs under separate statutes. Interagency coordination is essential to achieve the public benefit from state wide, comprehensive management and protection of the resource. Implementation of the Plan is to be carried out cooperatively by the signatory agencies through Memoranda of Agreement (MOA) as necessary and appropriate. For purposes of coordination the Agency of Natural Resources is the lead agency and as designated by statute is advised by the Ground Water Coordinating Committee.

B. Goal

The coordination goal is for Vermont to implement a comprehensive ground water management program through coordination among the signatory agencies operating under their respective statutory mandates.

C. Objectives

1. The signatory agencies agree to develop and implement memoranda of agreements (MOA) by 6-30-92 through which they will effectively coordinate a statewide interagency ground water management program. The MOA's will address the major issues identified in this plan and other issues as necessary and

appropriate to implement an interagency Ground Water Management Program.

2. The signatory agencies agree to support the advisory functioning of the Ground Water Coordinating Committee at regular meetings as necessary, to effectively coordinate the management of the state's ground water resources.

3. The signatory agencies agree to seek by 7-1-92 or as soon thereafter as feasible and necessary, any additional statutory authority needed to manage and protect ground water resources consistent with existing statutory policy and directives. The scope of any needed additional authority is to be developed by the respective signatory agencies.

4. The signatory agencies agree to develop and implement by 7-1-95 any needed rules procedures and guidelines or revisions thereof as may be necessary and appropriate to manage and protect Vermont's ground water resources.

II. INTEGRATION OF PROGRAMS, RULES AND PROCEDURES

A. Discussion

Vermont's ground water protection statute, 10 VSA, Chapter 48, provides for integrating the ground water management strategy with other regulatory programs administered by the Secretary of the Agency of Natural Resources. However, the other agencies whose programs affect ground water have no similar mandates. The purpose of this Plan, therefore, is to establish the initial agreement, direction, scope, priorities, goals and objectives by which Vermont will develop a comprehensive statewide program. Specific details of the

coordinated program are to be addressed by Memoranda of Agreements (MOA) among the signatory agencies. For example the Agency of Transportation uses sodium chloride for deicing roads in winter. Sodium and chloride ions leach into the ground and eventually reach the ground water. Nearby water wells have been known to pull in the contaminated water. Since sodium is a health risk to some citizens we have a problem which involves three agencies:

Transportation, Natural Resources and Human Services. Presently the AOT is "permitted" to spread road salt under a so called 1272 order by ANR. This order establishes a cooperative agreement to evaluate salt storage sites to reduce the leaching of salt into the ground. The result should be a reduction in sodium levels in ground water and drinking water supplies, and thereby a reduced risk to public health.

B. Goal

The integration goal is for the signatory agencies to have integrated ground water management and protection throughout their respective statutory programs by 1995.

C. Objectives

1. The Agency of Transportation (AOT) agrees to continue its salt management program consistent with its mission to maintain safe highways, and any current § 1272 order from the Agency of Natural Resources.

2. The Agency of Natural Resources agrees to integrate ground water management into each of its regulatory programs as appropriate to protect ground water by 1992. These programs include: hazardous materials, solid waste, water supply, pollution control, small scale sanitary systems and indirect discharges.

3. The Department of Agriculture agrees to continue the development and implementation of an Agricultural Chemicals In Groundwater strategy by 1992 in cooperation with the Agencies of Human Services and Natural Resources.

4. The Department of Health agrees to continue to regulate public water supplies including initiating the development of Source Protection Plans, also known as Well Head Protection Area (WHPA) plans, in coordination with the other signatory agencies by 1991.

Chapter 2, MAJOR INTERAGENCY ISSUES (cont'd.)

III. DATA COLLECTION (also see data management)

A. Discussion

One of the major interagency issues relating to ground water management in Vermont is the lack of accurate data by which to define the resource. We do know that discontinuous sand and gravel aquifers lie buried beneath many valley floors and we know that they are used here and there to meet community and industrial needs for water. However, we do not have enough information to accurately map and quantify these aquifers. Further, we know that most rural dwellings obtain their drinking water from fractured crystalline bedrock aquifers. However, we do not yet have sufficient knowledge of the structure and performance of these aquifers to allow effective management. We also lack information on the ambient quality of the ground water resource and the potential sources of contamination as well as good documentation concerning known problems. Therefore, Vermont has a particular need for all agencies of the state to collect and share groundwater data with all other state, regional and local agencies for a better understanding of the resource. By means of the agreement incorporated in this management plan the signatory agencies agree to share all appropriate data relative to the state's groundwater resources.

B. Goal

The data collection goal is for all signatory agencies to collect and share all appropriate groundwater data consistent with their respective statutory authorities.

C. Objectives

1. Each signatory agency agrees to develop and implement specific program objectives and work plan elements consistent with statutory mandates to achieve the data collection goal by 1995. In developing and implementing these objectives the signatory agencies agree to cooperate with each other and the Vermont Office of Geographical Information System (OGIS) in order to achieve a comprehensive and consistent data base.

2. The signatory agencies agree to support the development and implementation of a statewide unified system with criteria and standards for locating data points which is fully compatible with the Vermont Geographical Information System (GIS), and existing federal standards if feasible. The work is to proceed as funding is available.

3. The signatory agencies agree to cooperate with the USEPA, USGS, USDA and other appropriate federal agencies in the collection and sharing of groundwater data.

4. The signatory agencies agree to purchase jointly, when practicable, compatible global positioning satellite (GPS) equipment and to share use of this equipment when practicable to reduce costs. Purchases to begin during 1991 and continuing thereafter until the demand for locational information has leveled off.

5. The signatory agencies agree to press for accurate statewide mapping of major sand and gravel aquifers, and to develop a mapping strategy and work plans. The target milestone for completion is the year 2000 or as soon thereafter as possible.

6. The signatory agencies agree to investigate potential sources of contamination which are not now regulated by any state or federal program but which may pose risks to the use of ground water. Such investigations to proceed when and where feasible and necessary.

IV. DATA MANAGEMENT (also see data collection)

A. Discussion

In addition to the data collection issue Vermont has no unified system for managing its ground water data. This poses a considerable problem for the ultimate user and anyone preparing reports with the available data. Most data are buried in paper files. Some are available in electronic form but not in uniform formats.

B. Goal

The data management goal is to have compatible and coordinated electronic data management systems for ground water data in operation by 1995 or as soon thereafter as feasible.

C. Objectives

1. Each signatory agency, consistent with its statutory authority, agrees to develop and implement the appropriate components of compatible systems to identify, record, store and transmit ground water related data in consistent formats suitable for transmission to and use by its sister agencies, the VT. GIS and, as appropriate, interested federal agencies and other parties. Work to proceed during fiscal year 1992 or as soon thereafter as feasible. System design and testing to be completed by 6-30-94 or as soon thereafter as feasible.

V. RE-CLASSIFICATION, RISK ADVISORIES, AND WELL HEAD PROTECTION AREAS

A. Discussion

When the legislature revised the ground water statutes in 1985 it provided for four classes of ground water. In establishing Classes I and II the legislature had in mind the so called Aquifer Protection Areas (APA) as mapped to protect the recharge areas for municipally owned public water supply systems. Shortly thereafter the USEPA began promoting Well Head Protection Areas (WHPA) which were very similar in concept and function to the Vermont Aquifer Protection Areas (APA). The Department of Health was appointed the lead agency for the federal WHPA program. The DEC chose to map class I and class II areas to include the aquifer and its recharge area not just the area contributing to the well. During the process of adopting ground water regulations the Ground Water Coordinating Committee (GWCC) developed the concept of Ground Water Risk Advisories to warn of non-potable ground waters prior to or instead of class IV ground water designations.

B. Goal

The goal for a Ground Water Reclassification, Risk Advisory and Well Head Protection Areas Program is to create coordinated systems of designating land surface areas which will protect public and private water supplies and the ground water resource while balancing the need to maintain and promote a healthy and prosperous agricultural community.

C. Objectives

1. The signatory agencies agree that the first objective for reclassification, risk advisories, and WHPAs is to develop the policy statements and conceptual frame works for compatible and coordinated land surface area designation programs which are consistent with statutory

authority, easily implementable, effective, and politically acceptable. The lead agency for developing the draft document is the ANR. The target milestone for a strategy document is 12-31-91.

2. The signatory agencies agree that the second objective is for each agency with regulatory authority to write the necessary rules, procedures, and guidelines to implement such systems. The target milestone for these products is 6-30-92.

3. The signatory agencies agree, consistent with statutory authority, to implement the proposed land surface area designation programs, for WHPAs, Ground Water Classification Areas and GW Risk Advisory Areas, in cooperation with other state agencies, regional commissions, local governments and affected property owners. The target milestone for completion of a pilot project in one or more towns is 12-31-92. Full implementation should commence during early 1993. Boundaries and data from these programs are to be encoded into the Vermont Geographical Information System (GIS).

VI. EVALUATION OF WASTE DISPOSAL METHODS

A. Discussion

For many years it was believed that natural processes in the soil could safely treat mankind's wastes with no unwanted side effects. Now, however, there are concerns about the fate of viruses, synthetic chemicals, nitrate and other substances, all of which may migrate from waste disposal facilities to drinking water sources. Therefore, there is a need to evaluate the waste disposal and other practices in Vermont which take place on and beneath the land surface for their actual impact on the ground water resources and drinking water supplies. Further, there is a lack of certainty as to the best

waste disposal policy for Vermont to follow in the future. Should sanitary, domestic type wastes be treated and discharged to surface waters or has the addition of man-made cleansers and other chemicals rendered this technology obsolete and too risky? Is the subsurface the best place for waste treatment and disposal? Are there cost effective alternatives to on-site wastewater disposal for rural Vermonters?

B. Goal

The goal for evaluating waste disposal methods is to conduct such studies and research as may be necessary and appropriate to determine whether our current waste disposal practices are providing adequate protection for drinking water sources and the ground water resource itself.

C. Objectives

1. The signatory agencies agree to cooperate with the USEPA Office of Ground Water in a literature search to evaluate waste disposal practices as they relate to ground water management in northern glaciated terrains. The target milestone for this work is 12-31-91.

2. The signatory agencies agree to conduct one or more pilot studies of ground water conditions in Vermont at sites down gradient from potential contamination sources identified during the literature search. The lead agency to be determined by agreement among the Signatory Agencies. Work to proceed after the literature search has been evaluated and the funding secured. The target milestone is 12-31-93.

3. The signatory agencies to agree to publish the results of the pilot studies with recommendations for the resolution of any documented problems. The target milestone is 6-30-94.

4. The signatory agencies agree to hold one or more public hearings to report the results of the state's studies, and to gain public support for any proposed new initiatives. The target milestone is 12-31-94.

VII. PUBLIC EDUCATION

A. Discussion

One of the major Interagency issues is the lack of public knowledge about ground water as a resource and the concepts which explain its occurrence and movement. If ground water protection is to gain enough popular support to have aquifer mapping and ground protection programs funded, we need to educate the public to the point that there is an appreciation of the value of the resource, its susceptibility to contamination and the economics of contamination prevention as compared to the cost of cleanup.

B. Goal

The public education goal is to educate the public to the point that there is a general appreciation of ground water as a natural resource that needs protection and management in order to protect the public health.

C. Objectives

1. The signatory agencies agree, consistent with statutory authority, to educate local officials of the need to protect ground water resources at the local governmental level. A revision of the "Ounce of Prevention" handbook will be written and published by the Ground Water Management Section with review and comment by the GWCC. Milestone for this work is 6-30-92.

2. The signatory agencies agree to develop and implement an educational program in cooperation with teachers, the UVM Extension Service and other interested parties, to reach students in the lower primary grades. The lead agency is the Ground Water Management Section with review and comment by the GWCC. The milestone for this work is 12-31-92.

3. The signatory agencies agree to reach the general public with the ground water management message in cooperation with service clubs, the Extension Service and any other interested organizations or individuals who may wish to sponsor or co-sponsor educational opportunities. The milestone is ongoing as opportunities arise.

VIII. TECHNICAL ASSISTANCE

A. Discussion

Most local governments do not have the resources to begin to address ground water related issues. Technical assistance is not generally available at the regional level. Most requests for assistance from local governments with ground water problems are addressed to one agency of state government or another. Almost all of the requests for technical assistance are handled by the state agencies identified in this document.

B. Goal

The technical assistance goal is to provide help for municipal governments, regional commissions and state agencies as authorized by statute and allowed by available resources.

C. Objectives

1. The signatory agencies agree to develop a system to prioritize their respective responses to requests for ground water related Technical Assistance. The lead agency is Natural Resources as advised by the GWCC. The milestone for system development is 6-30-91.

2. The signatory agencies agree to provide ground water related technical assistance to municipal governments, regional commissions and other state agencies according to the above referenced priority system as resources permit. The milestone is ongoing.

3. The signatory agencies agree to provide information concerning potential sources of ground water contamination to all interested parties through the Vermont GIS. This assistance to be ongoing by the agencies generating the data, ie. Solid Waste, Hazardous Materials, Permits, Compliance and Protection, AOT and VDAF&M. (also see Section IV of Chapter 2, Data Management).

IX. RIGHTS TO USE OF GROUND WATER

A. Discussion

Several state programs have proposed or are using a "first in time-first in rights" policy to settle conflicting uses of the ground water resources. For example an application to use a proposed ground water supply source could be denied if a waste disposal permit application had already been accepted within what would have been the water supply source's protection area. In other words waste disposal uses of the ground water could preempt public water supply uses if the waste disposal application were filed first. From one perspective this seems to be contrary to the statutory policy expressed in 10 VSA § 1390 which is to protect ground water resources for high quality drinking water and to minimize risks of ground water quality deterioration. The law further states that the risk is to be minimized by limiting human activities that present unreasonable risks to the use classifications in the vicinity. At the present time all of the state is classified as Class III ground water for which the use is individual domestic water supply, irrigation, agricultural use and general industrial and commercial use. Further, the legislature found that all persons have a right to the beneficial use and enjoyment of ground water free from unreasonable interference by other

persons (10 VSA § 1410 (a) (4)). It may be unreasonable, therefore, that anyone should have their use of Class III ground water preempted by another user especially when the second use will probably result in degradation below Class III standards. On the other hand state agencies have no available alternative for permitting uses of the ground water other than on a first come, first permitted basis.

B. Goal

To clarify the rights to the use of ground water issue.

C. Objectives

1. The signatory agencies agree to request a written Attorney General's opinion as to this issue. The target milestone for the requesting letter is 6-30-91.

2. The signatory agencies agree to assess the written Attorney General's opinion and its implications for state programs. The results of the assessment are to be formalized in a report to the Secretaries of the agencies with recommendations for any needed changes in statute, regulations or programs. The target milestone for this report is 6-30-92.

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APPENDIX I

Draft Stormwater Procedures

DRAFT STORMWATER PROCEDURES

April 1987

Department of Water Resources and Environmental Engineering
Permits, Compliance, and Protection Division

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CHAPTER ONE - AUTHORITY

1.00 Authority

According to 10 V.S.A. Chapter 47, 1263(a) any person who wishes to discharge waste into waters of the State shall make application to the secretary for a discharge permit. 10 V.S.A. Chap. 47 1264 (b) recognizes the inherent differences between the discharge of stormwater runoff and other discharges. Section 1264 (a) further defines stormwater runoff as "limited to collected discharges from large scale developments to sensitive water quality areas."

In the Water Quality Standards, the Water Resources Board established general standards by which the secretary was directed to "manage discharges of stormwater runoff in as cost effective a manner as possible...", consistent with the provisions of Section 2-05. The following procedures are consistent with both 10 V.S.A. Chapter 47 and the Vermont Water Quality Standards. These procedures define the Department's administrative process for the issuance of discharge permits for stormwater runoff.

1.10 Applicability

Upon adoption, these procedures are applicable to all discharges of stormwater runoff in the State of Vermont.

1.20 Property Rights

The issuance of a discharge permit for stormwater runoff does not convey any property rights in either real or personal property, or any exclusive privileges; nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations; nor does it waive the necessity of obtaining State or local assent required by law for the discharges authorized.

CHAPTER TWO - DEFINITIONS

- "Applicant" - means the person who owns the existing or proposed development.
- "Application" - means the forms prescribed by the secretary for use in applying for a discharge permit.
- "Development" - means the construction of improvements on a tract or tracts of land, owned or controlled by a person.
- "Discharge" - as defined by 10 V.S.A. Chapter 47, means the placing, depositing, or emission of any wastes, directly or indirectly, into an injection well or into waters of the State.
- "Discharge Permit" - a permit issued pursuant to 10 V.S.A. Chapter 47, 1263.
- "Existing Developments" - are those developments which were built prior to the adoption of these procedures.
- "Impervious Surfaces" - means those surfaces from which precipitation runs off rather than infiltrates.
- "Large-Scale Development" - means a development from which a major discharge of stormwater occurs. Major discharges of stormwater occur when one of the following conditions are met:
- a. when the total area of roads and parking lots exceeds ten (10) acres; or
 - b. when the total area of roads and parking lots is greater than one (1) acre but less than ten (10) acres and when the ratio of watershed area (in square miles) to total area of roads and parking lots (in acres) is less than three to one (3:1).
- "Letter of Compliance" - a standard letter, signed by the applicant, which states that (1) the plans for the proposed development are in accordance with the stormwater treatment and control requirements specified in Chapter Four of these procedures, and (2) the development will be constructed according to those plans insofar as stormwater management is concerned.
- "New Developments" - include any subsequent expansion or alteration of existing developments which occurs after the date of the adoption of these procedures and all developments built after that date.
- "Permit Regulations" - refers to the "Vermont Water Pollution Control Permit Regulations", subchapter 13.

- "person" - means an individual, partnership, public or private corporation, municipality, institution or agency of the state or federal government and includes any officer or governing or managing body of a partnership, association, firm, or corporation.
- "Stormwater Runoff" - means natural precipitation which does not infiltrate into the soil and which is not contaminated by contact with process wastes, raw materials, finished or intermediate products, toxic pollutants, hazardous pollutants, or oil and grease. Stormwater runoff may contain trace amounts of pollutants due to normal traffic and parking facilities.
- "Wastes" - as defined by 10 V.S.A. Chapter 47, means effluent, sewage, or any substance or material - liquid, gaseous, solid, or radioactive, including heated liquids - whether or not harmful or deleterious to waters.
- "Water Quality Standards" - refers to the Vermont Water Quality Standards, revised January 8, 1987, as adopted by the State of Vermont, Water Resources Board.
- "Waters" - as defined by 10 V.S.A. Chapter 47, includes all rivers, streams, creeks, brooks, reservoirs, ponds, lakes, springs, and all bodies of surface waters, artificial or natural, which are contained within, flow through, or border on the State or any portion of it.
- "Waters of the State" - for the purposes of these procedures, includes the bodies of water listed as "waters" in 10 V.S.A. Chapter 47. However, water courses which drain an area of less than 300 acres shall not be considered "waters of the State" unless the Department finds that such water courses exhibit characteristics or values protected by Chapter 47.

CHAPTER THREE - DESCRIPTION AND CLASSIFICATION OF DEVELOPMENTS

3.00 Introduction

This Chapter classifies all developments which discharge stormwater runoff to waters of the State. The Department recognizes two general types of developments: existing and new.

3.10 Existing Developments

Existing developments are those developments which were built prior to the adoption of these procedures.

3.20 New Developments

3.21 New Developments include any subsequent expansion or alteration of existing developments which occurs after the date of the adoption of these procedures and all developments built after that date.

3.22 For the purposes of these procedures, new developments are further classified into groups. Before defining those groups, it is important to define the concept of watershed area and also the concept of the ratio of the watershed area to the total area of roads and parking lots. These concepts are used in determining the development group of a new development.

Watershed Area is the drainage area above the the most upstream discharge from a development. If a development discharges to more than one receiving water, watershed area calculations must be made above the most upstream discharge on each receiving water.

Ratio of Watershed Area to Total Area of Roads and Parking Lots is the relationship of the watershed area, in square miles, to the total area of roads and parking lots of the development, measured in acres. If a development discharges to more than one receiving water, the ratio must be calculated for each receiving water. For the purpose of determining the development group, the smallest ratio shall be used.

The following groups of new developments are hereby defined:

Group 1 - These developments have:

1. a total area of roads and parking lots of one (1) acre or less, or
2. a total area of roads and parking lots greater than one (1) acre but less than or equal to ten (10) acres and a ratio of watershed area (in square miles) to total area of roads and parking lots (in acres) of three to one (3:1) or greater.

EXCEPTION: For those developments which discharge directly to wetlands, lakes, or ponds, only those with a total area of roads and parking lots of less than one acre are in Group 1.

Group 1 Developments are considered minor stormwater discharges in the Water Quality Standards, Section 2-05.

Group 2 - These developments have a total area of roads and parking lots of greater than one (1) acre but less than or equal to ten (10) acres and a ratio of watershed area (in square miles) to total area of roads and parking lots (in acres) of less than three to one (3:1).

EXCEPTION: Any development which discharges directly to wetlands, lakes, or ponds and has a total area of roads and parking lots of greater than one acre but less than or equal to ten acres is in Group 2.

Group 2 Developments are considered major stormwater discharges in the Water Quality Standards, Section 2-05.

Group 3 - These developments have a total area of roads and parking lots of greater than ten (10) acres.

Group 3 Developments are considered major stormwater discharges in the Water Quality Standards, Section 2-05.

CHAPTER FOUR - TREATMENT, CONTROL, AND MAINTENANCE REQUIREMENTS

4.00 Introduction

The Vermont Water Quality Standards, effective January 8, 1987, require the use of infiltration, to the extent feasible, to dispose of stormwater runoff flows. The applicant must design the development to fit the site so that it maximizes the non-collection and infiltration capabilities of the site. Examples of maximizing infiltration include use of dry wells, infiltration trenches, and perforated pipe in sandy soils. Stormwater runoff from roads and parking lots which does not infiltrate must be treated. Stormwater runoff from all impervious surfaces such as roads, roofs, parking lots, sidewalks, etc., must be controlled to minimize peak runoff from the site.

4.10 Treatment

4.11 Treatment of stormwater runoff requires the use of grassed/vegetated areas or sedimentation basins to remove sediment and contaminants. Treatment of stormwater runoff must occur 1) on the development site and 2) prior to discharge to waters of the State. Waters of the State shall not be used for the treatment of stormwater runoff.

4.12 Overland flow, as used in these procedures, is stormwater which is not collected. Overland flow must be utilized to the extent that site conditions allow. For use as treatment, a minimum 25-foot-wide grass/vegetated buffer strip must be maintained around all roads and parking areas.

In areas where development roads cross waters of the State, disturbance in the vicinity of the waters must be kept to a minimum.

4.13 Grassed swales must be utilized for treatment if the development site is not conducive to overland flow as defined in Section 4.12. A minimum ratio of 100 linear feet of grassed swale per acre of road and parking lot area is required for each discharge point. When possible, swales should be designed to minimize the velocity in the channel to less than ^{two} ~~one~~ foot-per-second for the runoff from a 10-year, 24-hour storm.

Stabilization of swales to prevent erosion is required for slopes greater than 5 percent. Depending on the site, swales with slopes of less than 5 percent may also require stabilization to prevent erosion.

Stone-lined swales may be used to prevent erosion and to convey stormwater but are not considered a method of treatment. Where topography dictates the use of stone-lined swales for conveyance of stormwater runoff from road surfaces, the diversion of such flows overland is required wherever possible. All swales must be designed and constructed according to the Soil Conservation Service Engineering Field Manual, "Chapter 7 - Grassed Waterways and Outlets."

4.14 Sedimentation basins must be utilized when development sites do not allow for the use of overland flow or grassed swales. The sedimentation basin must be a permanent structure designed on the basis of a 2-year, 24-hour storm. The basin must have 254 square feet of surface area per cubic-foot per second of calculated peak outflow and a minimum sediment collection depth of 18 inches (sump depth).

4.15 The Department recognizes that a combination of the above techniques, when employed as specified, constitute treatment of stormwater runoff.

4.16 Catch Basin Restrictions

Catch basins or equivalent structures, such as drop inlets, are not consistent with the Vermont Water Quality Standards. Catch basins collect and concentrate stormwater runoff, and, even when maintained, provide minimal treatment. Catch basins do not constitute adequate treatment by themselves.

Catch basins must have a minimum 18" sump depth and stormwater must be treated in conjunction with catch basins. Sedimentation basins can be utilized in conjunction with catch basins as per 4.14 of these procedures. Grassed swales and overland flow can be utilized in conjunction with catch basins. There must be a linear distance of 100 feet of vegetated terrain for each acre of road and parking area prior to discharge to waters of the State. Energy dissipators must be utilized when directing discharges from a catch basin network to grassed swales or overland. The energy dissipator must be designed to minimize the velocity of the runoff from a 10-year, 24-hour storm to less than one foot per second.

4.20 Control

- 4.21 The control of stormwater runoff requires the use of detention structures such that the **post-development peak flow from the site** does not exceed the **pre-development peak flow** based on the runoff from a 10-year, 24-hour design storm.
- 4.22 For purposes of detention, all impervious surfaces on the development site must be considered. The Soil Conservation Service Technical Release No. 55, "Urban Hydrology for Small Watersheds" shall be utilized to determine pre- and post-development peak flows from the site. Detention structure(s) must be sized such that there is no increase in peak flow based on the runoff from a 10-year, 24-hour design storm.
- 4.23 Detention of stormwater runoff must be accomplished prior to discharge to waters of the State. However, wetlands, ponds, and lakes may be utilized, in their natural state, to detain stormwater flows if the existing values of these areas remain unchanged. **All treatment of stormwater runoff must occur prior to discharge to these areas.** No detention structures may be constructed in these areas without the approval of the Department.

4.30 Maintenance

All treatment devices, structures, or facilities must be maintained in good operating order at all times and shall be cleaned, as necessary, to maintain treatment design levels. Paved roads and parking lots should be swept on a regular basis, when seasonally practical, to minimize contaminants carried to the treatment device by runoff.

CHAPTER FIVE - PROCEDURES FOR ADMINISTRATION AND ISSUANCE OF PERMITS

5.00 Introduction

The Department has determined that all developments discharge stormwater runoff during the design 10-year, 24-hour storm. This chapter presents the administration and permitting process for these stormwater discharges.

5.10 Stormwater Runoff Discharges from New Developments

All stormwater discharges from new developments shall be regulated in accordance with the procedures listed below:

5.11 Group 1: No Permit Required

No discharge permit is required for stormwater discharges from developments classified in Group 1.

The Department **recommends** that these developments utilize the treatment, control, and maintenance techniques specified in in Chapter 4 of these procedures.

For developments in Group 1 the applicant shall submit a letter to the Department which states the name of the development, its location, the receiving waters, the total area of roads and parking lots, and the fact that the development is in Group 1. In response, the Department will issue a letter indicating that the development does not require a discharge permit for stormwater runoff because the development does not meet the definition of "large-scale development" as per 10 V.S.A. 1264.

Stormwater Discharges - Group 3

All discharges of stormwater runoff from developments classified in Group 3 shall be reviewed by the Department. If the Department determines that stormwater runoff from the development is being treated and controlled in compliance with these procedures, the Department will issue a stormwater discharge permit in accordance with subchapter 13 of the Vermont Water Pollution Control Permit Regulations and 10 V.S.A. Chapter 47, 1263. In order to be eligible for a stormwater discharge permit the applicant must submit:

1. Form WR-82 "Application For Permit To Discharge Wastes"
2. Form WR-82-D "Schedule D - Drainage Discharges". A Schedule D must be completed for each discharge to waters of the State.
3. Location Map - a photocopy of a topographic map clearly indicating the location of the proposed development.
4. Site Plan - detailed plans which indicate on-site drainage and contour information, all stormwater conveyances and control structures.
5. Calculations of the pre- and post-development peak flow for the development using TR-55 calculation sheets.
6. Application Fee: ~~\$20.00~~^{35.00} (subject to change by Legislature)

Within sixty days following a request of the secretary, a person who has filed an application shall furnish the secretary with such additional information as may be necessary to insure that such application is complete or which may otherwise be necessary to enable the secretary to issue a permit for such discharge. Only when such additional information is received will the application be considered complete. If the information requested is not received within the sixty day period, the application will be returned and the stormwater discharge permit denied. The applicant will need to re-apply to obtain a stormwater discharge permit.

5.20 Stormwater Runoff Discharges from Existing Developments

All existing developments with Temporary Pollution Permits will not require a new stormwater discharge permit under these procedures. These developments are bound by the conditions contained in such permits, whether expired or not.

All existing developments with Discharge Permits for stormwater runoff will not require a new stormwater discharge permit under these procedures. However, as stated in the permit, the applicant must apply for renewal of the discharge permit 180 days prior to the expiration date of the permit.

5.30 Expansion to Existing Developments

Any addition of impervious surface to existing developments constitutes new development. The applicant must determine the applicable development group based on the area of all existing and proposed roads and parking lots in the development. The applicant must follow the procedures for that group as listed in section 5.10 of this chapter.

In determining the need for detention, peak flows from the development shall be calculated using the 10-year, 24-hour design storm. The pre-development peak flow shall be calculated based on the conditions of the existing development. The post-development peak flow shall be calculated based on the conditions of the proposed (expanded) development. No increase in peak flow in excess of the pre-development condition shall be allowed.

5.40 Violation

The violation of these procedures or any condition of stormwater discharge permits issued pursuant to these procedures constitutes a violation of the Vermont Water Pollution Control Act, Title 10 V.S.A., Chapter 47, and is subject to the enforcement and penalty provisions specified in Sections 1274 and 1275 of the Act.

5.50 Severability

If any provision of these procedures or its application to any development or person is held to be invalid, the remainder of the rules and the application of that provision to other developments or persons shall not be affected.

APPLICATION CHECKLIST

Applicants should first determine which Group their development is in by using the classification system in Chapter Three of the Stormwater Procedures. Following this determination the applicant can use the following as guidelines for a complete application:

Group 1 Developments (Refer to Section 5.11)

_____ Letter signed by the applicant

Group 2 Developments (Refer to Section 5.12)

_____ WR-82
_____ WR-82-D (for each discharge to waters of the State)
_____ Location Map
_____ Site Plan
_____ TR-55 Calculation Sheets
_____ Letter of Compliance
_____ Application Fee

Group 3 Developments (Refer to Section 5.12)

_____ WR-82
_____ WR-82-D (for each discharge to waters of the State)
_____ Location Map
_____ Site Plan
_____ TR-55 Calculation Sheets
_____ Application Fee

STATE OF VERMONT
AGENCY OF ENVIRONMENTAL CONSERVATION
DEPARTMENT OF WATER RESOURCES
PERMITS AND COMPLIANCE DIVISION

APPLICATION FOR PERMIT TO DISCHARGE WASTES

Chapter 47 of Title 10 V.S.A.

1. Applicant _____ Legal Entity _____
2. Mailing Address _____

3. Contact _____ Telephone _____
4. Name of Activity _____ Location _____
5. Type of Activity _____
6. Nature of Wastes: ___ Sanitary ___ Industrial ___ Commercial ___ Drainage ___ Other
(Describe) _____
7. Receiving Water _____
8. Status of Discharge ___ Proposed ___ Existing (Permit No. _____)
9. The applicant hereby applies for a _____
_____ Discharge Permit _____ Indirect Discharge Permit
_____ Temporary Pollution Permit _____ Emergency Pollution Permit
_____ Pretreatment Discharge Permit _____ Pretreatment Temporary Pollution Permit
to discharge wastes, directly or indirectly, into water of the State from the
above named activity as described in this application, its attached schedule(s), plans and
specifications.
10. Application is for ___ Original Permit ___ Permit Renewal If this is for a permit
renewal, is original application still valid in all respects _____? If not, attached
schedule(s) for major changes. Minor changes may be documented by letter.
11. Enter below, using a separate serial number (S/N), to identify each independent discharge
which will result from the activity described in Item 4. Attached separate schedule for
each discharge identified below.
S/N 001 _____ 004 _____
002 _____ 005 _____
003 _____ 006 _____
12. Application Fee Enclosed \$ _____ Date of application _____
13. _____
AUTHORIZED REPRESENTATIVE (PRINT) TITLE SIGNATURE

INSTRUCTIONS

1. Applicant (name) and legal entity (individual, corporation, partnership, firm, state agency, municipality, etc.)
3. Contact Person to contact regarding this application.
4. Name of activity (John Doe residence, XYZ Corp., Clear Lake State Park, Green Motel, etc.)
5. Type of Activity (single family residence, paper mill, state park, motel, etc.)
6. Nature of Wastes: Sanitary (Domestic sewage only), Industrial/Commercial/Industrial (process wastes, cooling water rinse water, laboratory wastes, etc.) Drainage (stormwater, roof drains pond overflows, foundation drains, return flows, etc.)
7. Receiving waters For unnamed streams, so state and give named tributary. For discharges to "wells" (Vermont Water Pollution Control Permit Regulation 13.1(j)), enter "groundwater" and give name and distance to nearest surface water.
8. Complete as appropriate; provide permit number, if any, for existing discharge.
11. Identify and describe each separate discharge point to waters of the State.
12. Submit application fee in accord with fee schedule.

STATE OF VERMONT
AGENCY OF ENVIRONMENTAL CONSERVATION
DEPARTMENT OF WATER RESOURCES

D

APPLICATION FOR PERMIT TO DISCHARGE WASTES

SCHEDULE D - DRAINAGE DISCHARGES

Date _____

D-1 Applicant _____ Activity _____

D-2 Discharge S/N _____ Designation _____

D-3 Exact location on receiving water (describe and locate on map) _____

D-4 How are wastes conveyed to receiving water? _____

D-5 Type of Discharge:

STORMWATER RUNOFF

Sources (in acres): Paved Roads _____ A. Unpaved Roads _____ A.

Paved Parking Lots _____ A. Unpaved Parking Lots _____ A. Roofs _____ A.

Natural Terrain _____ A. Other (specify) _____ A. Total _____ A.

Pre-Development Peak Flow _____ CFS Post-Development Peak Flow _____ CFS

Receiving Stream Watershed Area (sq. miles) above discharge point _____ sq. mi.

Ratio of Stream Watershed Area (sq. miles) to Area of Road and Parking Lots (acres): _____

Proposed Treatment (check all that apply): Grass or Stone-lined Swales _____.

Overland Flow Across Vegetated Terrain _____. Catch Basins _____.

Detention Pond (attach design details) _____.

Sedimentation Basin (attach design details) _____.

Other (specify and attach design details) _____.

GROUNDWATER AND RETURN FLOWS:

Source (check which applies): Foundation Drain _____. Curtain Drain _____. Spring _____

Well _____. Mine _____. Quarry _____. Pond _____. Water Wheel of Turbine _____

Filter Backwash _____. Other (specify) _____.

Discharge: Estimated Discharge _____ CFS Frequency _____.

Duration _____. Pumping required? _____.

Contaminants present (specify) _____.

Proposed Treatment: _____.

D-6 Additional Information: _____

INSTRUCTIONS

Incomplete applications will be returned to the applicant.

- D-1 Applicant Same as Item 1 on Application (WR-82)
- Activity Same as Item 4 on Application (WR-82)
- D-2 Discharge Same as Item 11 on Application (WR-82). Complete a separate Schedule D (WR-82D) for each drainage discharge identified in Item 11.
- D-3 Location
1. Name receiving water and describe with reference to a known landmark, e.g. 1000' upstream of RR bridge in village, 550' above mouth, etc., or give geographical coordinates (latitude and longitude).
 2. Also identify each discharge point to receiving waters by serial number, e.g. S/N 001, 002, etc., on copy of U.S.G.S. topographical map and on the site plan.
- D-4 Conveyance Describe routing of discharges to surface waters of the State; e.g. through grass-lined swales, culverts, prior to discharge to the receiving stream.
- D-5 Type of Discharge Complete appropriate section(s)

Instructions for Stormwater Runoff Only:

Peak Flows - Calculate pre and post-development peak flows from the site using the Soil Conservation Service Technical Release No. 55 (2nd Ed., June, 1986). Use a 10 year - 24 hour storm event as the design storm. Attach all calculations on forms provided.

Watershed Area

1) Single or multiple discharges to the same receiving water - Determine the watershed area (sq. miles) above the most upstream discharge point. Calculate the ratio of watershed area (sq. miles) to the total area of roads and parking lots (acres) draining to the receiving water.

2) Discharges to more than one receiving water - Determine the watershed area (sq. miles) above the most upstream discharge point for each receiving water. Calculate the ratio of watershed area (sq. miles) to the total area of roads and parking lots (acres) draining to each receiving water.

Proposed Treatment - Treatment of stormwater runoff must occur both on site and prior to discharge to surface waters of the State. All projects must utilize infiltration into soil to the extent feasible to dispose of stormwater runoff as per the Vermont Water Quality Standards, revised January 8, 1987. Where detention is required, detention pond design should be based upon a 10 year - 24 hour storm event. The minimum requirement for sedimentation basin design is 254 square feet/cfs of outflow; the 2 year - 24 hour storm is recommended for this design.

- D-6 Additional Complete as needed.

For further information call (802/244-5674) or write:

Department of Water Resources
Permits and Compliance Section
103 South Main Street
West Office Building
Waterbury, Vermont 05676

The following two examples demonstrate how to complete the Schedule D and the Watershed/Road and Parking Lot Area ratio:

Example 1: Multiple discharges to the same receiving water

A hypothetical subdivision contains a total of 2.5 acres of road surface (paved and unpaved) and 1.2 acres of parking lots (paved and unpaved). These surfaces will discharge to one receiving stream but there are three discharge locations on that stream. The watershed area of the stream above the most upstream discharge point is 7.4 square miles. The applicant should calculate the ratio as follows:

Ratio = Stream Watershed Area (sq. mi.) / Total Area of Roads and Parking Lots
Ratio = 7.4 sq. mi. / 2.5 acres + 1.2 acres
Ratio = 2.0

For an application of this type to be complete, the applicant should submit three Schedule D's (one for each discharge to the receiving stream). The stream watershed section and the ratio section of the Schedule D need only be filled out for the most upstream discharge. However, all other sections must be completed on each Schedule D including the area of roads and parking lots contributing to that particular discharge point and the type of proposed treatment which the stormwater will receive on site.

Example 2: Discharges to more than one receiving water

Using the same hypothetical subdivision as in example 1, two of the three discharges are to one receiving stream and the third discharge is to a tributary of that stream. Therefore, there are discharges to two receiving waters. Of the total 2.5 acres of road surface, 1.5 acres discharges to the stream and 1.0 acres discharges to the tributary. Of the total 1.2 acres of parking lots, 1.0 acres discharges to the stream and 0.2 acres discharges to the tributary. The watershed area of the stream above the most upstream discharge point is 7.4 square miles. Therefore, the ratio for the stream discharges is calculated as follows:

Ratio = 7.4 sq. mi. / 1.5 acres + 1.0 acres
Ratio = 7.4 sq. mi. / 2.5 acres
Ratio = 2.96

For the stream discharges, two Schedule D's would be completed and, as in example 1, the receiving stream watershed section and the ratio need only be filled out on the Schedule D for the most upstream discharge. However, because the subdivision also discharges to the tributary, the third Schedule D would contain the tributary watershed information as well as the ratio. For a tributary watershed area of 1.2 square miles the ratio for the tributary discharge would be calculated as follows:

Ratio = 1.2 sq. mi. / 1.0 acres + 0.2 acres
Ratio = 1.2 sq. mi. / 1.2 acres
Ratio = 1.0

As before, each Schedule D for the project must be filled out in its

WORKSHEETS FOR TR-55 CALCULATIONS

For Groups 2 and 3, TR-55 worksheets for the pre- and post-development peak flow calculations are part of a complete application. Select one of the two methods offered by TR-55 and complete the worksheets listed below:

- I. Graphical Method - For hydrologically homogeneous sites which are not divided into subareas.

Worksheets #2,3, and 4 must be submitted.

If a detention or sedimentation pond is used, then Worksheet #6a OR 6b must also be submitted.

- II. Tabular Method - For hydrologically nonhomogeneous sites which are divided into subareas.

Worksheets #2,3,5a, and 5b must be submitted.

If a detention or sedimentation pond is used, then Worksheet #6a OR 6b must also be submitted.

NOTE: If the computerized version of TR-55 is used for calculating peak flows, then the computer printouts may be submitted in place of the worksheets listed above.

Worksheet 2: Runoff curve number and runoff

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed _____

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN ^{1/}			Area <input type="checkbox"/> acres <input type="checkbox"/> mi ² <input type="checkbox"/> %	Product of CN x area
		Table 2-2	Fig. 2-3	Fig. 2-4		
		Totals =				

^{1/} Use only one CN source per line.

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{\quad}{\quad} = \quad; \quad \text{Use CN} = \boxed{\quad}$$

2. Runoff

Frequency yr
 Rainfall, P (24-hour) in
 Runoff, Q in
 (Use P and CN with table 2-1, fig. 2-1,
 or eqs. 2-3 and 2-4.)

Storm #1	Storm #2	Storm #3

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed _____

Circle one: T_c T_t through subarea _____

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)

Segment ID

1. Surface description (table 3-1)
2. Manning's roughness coeff., n (table 3-1) ..
3. Flow length, L (total L \leq 300 ft) ft
4. Two-yr 24-hr rainfall, P_2 in
5. Land slope, s ft/ft
6. $T_c = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} s^{0.4}}$ Compute T_c hr

+	=

Shallow concentrated flow

Segment ID

7. Surface description (paved or unpaved)
8. Flow length, L ft
9. Watercourse slope, s ft/ft
10. Average velocity, V (figure 3-1) ft/s
11. $T_c = \frac{L}{3600 V}$ Compute T_c hr

+	=

Channel flow

Segment ID

12. Cross sectional flow area, a ft²
13. Wetted perimeter, p_w ft
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r ft
15. Channel slope, s ft/ft
16. Manning's roughness coeff., n
17. $v = \frac{1.49 r^{2/3} s^{1/2}}{n}$ Compute V ft/s
18. Flow length, L ft
19. $T_c = \frac{L}{3600 V}$ Compute T_c hr
20. Watershed or subarea T_c or T_t (add T_c in steps 6, 11, and 19) hr

+	=

Worksheet 4: Graphical Peak Discharge method

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed _____

1. Data:

- Drainage area A_m = _____ mi^2 (acres/640)
- Runoff curve number CN = _____ (From worksheet 2)
- Time of concentration .. T_c = _____ hr (From worksheet 3)
- Rainfall distribution type = _____ (I, IA, II, III)
- Pond and swamp areas spread throughout watershed = _____ percent of A_m (____ acres or mi^2 covered)

2. Frequency yr

3. Rainfall, P (24-hour) in

4. Initial abstraction, I_a in
(Use CN with table 4-1.)

5. Compute I_a/P

6. Unit peak discharge, q_u csm/in
(Use T_c and I_a/P with exhibit 4-_____)

7. Runoff, Q in
(From worksheet 2).

8. Pond and swamp adjustment factor, F_p
(Use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond and swamp area.)

9. Peak discharge, q_p cfs
(Where $q_p = q_u A_m Q F_p$)

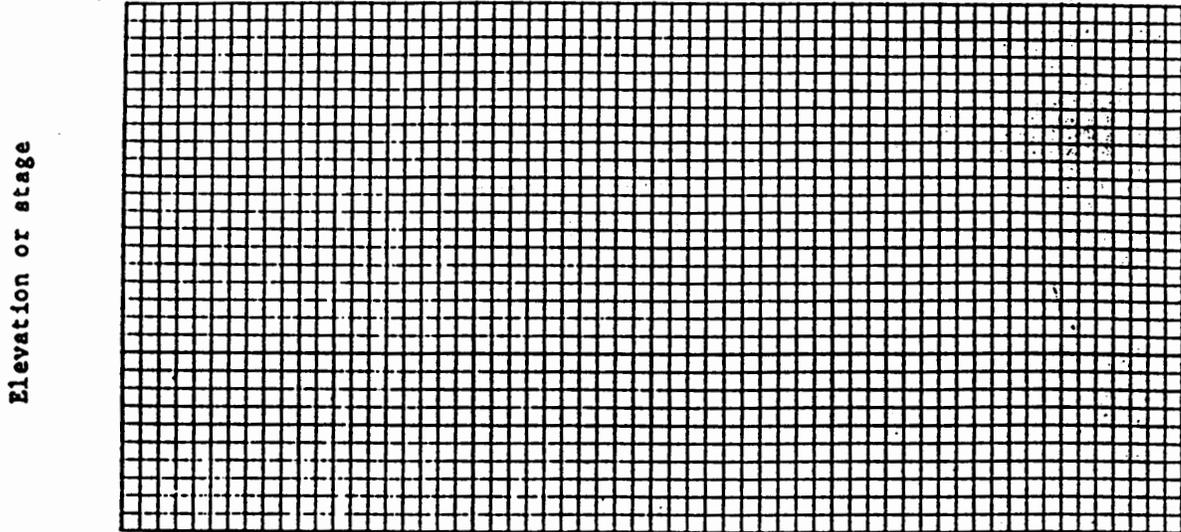
	Storm #1	Storm #2	Storm #3
2. Frequency			
3. Rainfall, P (24-hour)			
4. Initial abstraction, I_a			
5. Compute I_a/P			
6. Unit peak discharge, q_u			
7. Runoff, Q			
8. Pond and swamp adjustment factor, F_p			
9. Peak discharge, q_p			

Worksheet 6a: Detention basin storage, peak outflow discharge (q_0) known

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed _____



Detention basin storage

1. Data:
 Drainage area $A_m =$ _____ m^2
 Rainfall distribution
 type (I, IA, II, III) = _____
2. Frequency yr

--	--
3. Peak inflow discharge, q_1 cfs

--	--

 (From worksheet 4 or 5b)
4. Peak outflow discharge, q_0 cfs

--	--

^{1/}
5. Compute $\frac{q_0}{q_1}$

--	--
6. $\frac{V_s}{V_r}$

--	--

 (Use $\frac{q_0}{q_1}$ with figure 6-1)
7. Runoff, Q in

--	--

 (From worksheet 2)
8. Runoff volume, V_r ac-ft

--	--

 ($V_r = QA_m 53.33$)
9. Storage volume, V_s ac-ft

--	--

 ($V_s = V_r (\frac{V_s}{V_r})$)
10. Maximum stage, E_{max}

--	--

 (From plot)

^{1/} 2nd stage q_0 includes 1st stage q_0 .

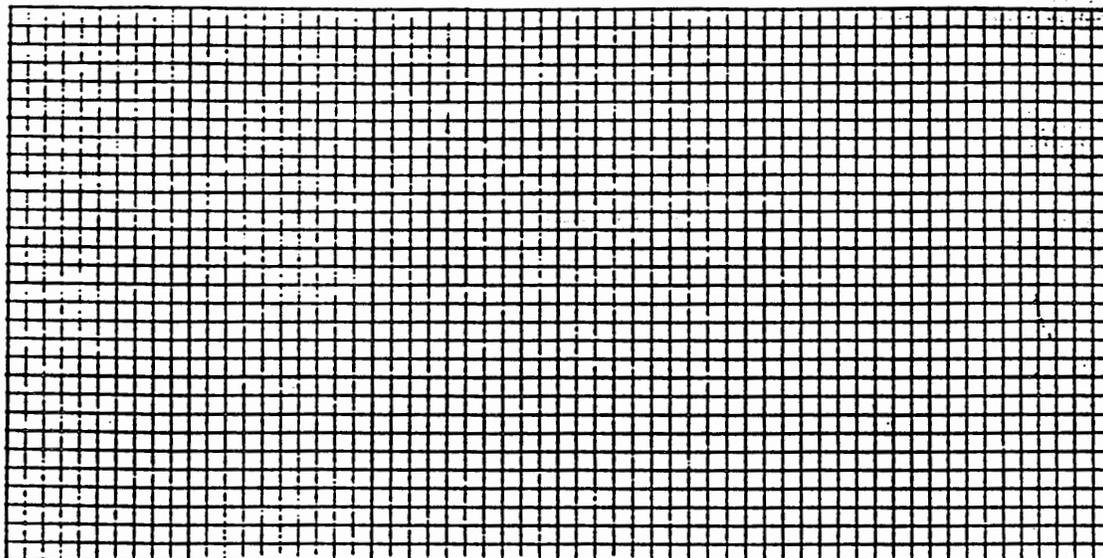
Worksheet 6b: Detention basin peak outflow, storage volume (V_s) known

Project _____ By _____ Date _____

Location _____ Checked _____ Date _____

Circle one: Present Developed _____

Elevation or stage



Detention basin storage

1. Data:
 Drainage area $A_m =$ _____ mi^2
 Rainfall distribution
 type (I, IA, II, III) = _____

1st stage	2nd stage
--------------	--------------
2. Frequency yr

--	--
3. Storage volume,
 V_s ac-ft

--	--
4. Runoff, Q in
(From worksheet 2)

--	--
5. Runoff volume,
 V_r ac-ft

--	--

($\bar{V}_r = QA_m 53.33$)
6. Compute $\frac{V_s}{V_r}$

--	--
7. $\frac{q_o}{q_1}$ in

--	--

(Use $\frac{V_s}{V_r}$ and figure 6-1)
8. Peak inflow discharge, q_1 cfs

--	--

(From worksheet 4 or 5b)
9. Peak outflow discharge, q_o cfs

--	--

($q_o = q_1 \left(\frac{q_o}{q_1}\right)$)
10. Maximum stage, E_{max}

--	--

(From plot)

1/ 2nd stage q_o includes 1st stage q_o .