

Vermont Department of Environmental Conservation

Request for Proposals

Hydrodynamic and Water Quality Modeling of Causeway Removal at Carry Bay in Lake Champlain (North Hero, Vermont)

Released December 13, 2002

Background and Purpose of Study

Severe algae blooms and nuisance aquatic plant growth in the vicinity of Carry Bay and Alburg Passage in Lake Champlain have generated interest by local residents in removing the abandoned railroad causeway fill on the western side of Carry Bay in order to restore natural water circulation and potentially improve water quality in the area. In response to this interest, the Vermont General Assembly included the following requirement in the FY 2003 Appropriations Act (No. 142, Section 219), and provided \$25,000 for the Vermont Agency of Natural Resources to conduct this study.

(a) The agency of natural resources shall study the restoration of natural water flow and related issues, including wave action, with a goal of reducing phosphorus levels in the following portions of Lake Champlain: Albert (sic) Passage, Pelots Bay, Carry Bay, and Macomb Bay. The secretary of natural resources shall report to the general assembly, by January 15, 2004, with the results of the study.

The Vermont Department of Environmental Conservation is seeking a qualified scientific or engineering consultant to conduct a hydrodynamic and water quality modeling study of the effects of causeway removal at Carry Bay, Lake Champlain. The study area is shown on NOAA Chart No. 14781 (Riviere Richelieu to South Hero Island) and on the North Hero, VT-NY USGS 7.5' Quadrangle.

The major purpose of the study is to determine what changes would occur in phosphorus concentrations and algae levels in the area if the causeway were removed, either completely or partially. The effects of causeway removal on other water quality variables such as sedimentation patterns, temperature, and dissolved oxygen are of interest, as well. A secondary purpose of the study is to predict changes in wave heights and wave energies on shoreline areas where such changes might occur as a result of causeway removal.

The Department of Environmental Conservation will be advised on the conduct of this study by a Project Advisory Committee composed of local residents and other concerned citizens. The contractor will interact with the Project Advisory Committee through presentation of interim project findings and draft reports.

Scope of Work

Respondents to this request should feel free to propose a technical approach that, in their professional judgment, best meets the purposes of the study. Guidance on the desired scope of work and the distribution of effort is provided below.

1. Approximately 80-90% of the study effort should be directed at predicting water quality effects of causeway removal, with the remainder of the effort directed at wave effects.
2. The major water quality variables to be quantitatively simulated are total phosphorus and algae (e.g., chlorophyll) concentrations. However, other water quality and physical variables are of interest as well, and should be included to the extent possible even if the analysis for these variables must be less quantitative than for phosphorus. These other variables include current velocities, sedimentation patterns, temperature, and dissolved oxygen concentration.
3. The lake areas to be included in the modeling analysis are Carry Bay, Alburg Passage, Pelots Bay, Macomb Bay, and lake regions immediately west of Carry Bay where phosphorus concentration changes could occur in response to causeway removal.
4. It is expected that this study will require new field data collection as well as use of existing data to develop, calibrate, and verify the modeling analysis. In-kind support for field data collection can be made available at no cost to the contractor from Department of Environmental Conservation staff and from local resident volunteers. In proposing new field data collection for this study, respondents may incorporate in-kind assistance of the following nature:
 - a. The Department operates a long-term water quality monitoring program on Lake Champlain (described at <http://www.lcbp.org/LTMP2.htm>). Types of no-cost support available to the contractor from this program include boat time, water sampling, and laboratory chemical analyses for total phosphorus, natural tracers (e.g. chloride), and other water quality variables.
 - b. The types of assistance that local resident volunteers may be able to provide include simple maintenance and reading of lake level gages or other instrumentation.
5. The predictive modeling analysis for both water quality changes and wave effects will include two causeway removal scenarios: (1) complete removal, and (2) partial removal, with the specific configuration to be determined in consultation with the Project Advisory Committee.
6. The focus of the modeling analysis should be on summer conditions, including prevailing winds, lake levels, stream flows, and lake thermal features typical of summer conditions.
7. Proposals should include provision for at least two meetings in the local area with Department of Environmental Conservation staff and the Project Advisory Committee. The first meeting should occur near the beginning of the study in order to describe the field work to be conducted and to coordinate any local assistance needed. The second meeting should occur toward the end of the project to present and discuss the study findings and receive comments on a draft final report.

Project Schedule and Reports

It is expected that a contract will be executed for this work no later than May 1, 2003. A draft final report for review by the Department of Environmental Conservation and the Project Advisory Committee will be due by November 1, 2003. A final project report incorporating changes made in response to timely review comments will be due December 15, 2003. The final report must include an executive summary, a methods section, results in narrative and graphical form, and conclusions directly addressing the study questions.

Content of Proposals

Proposals must be no more than 15 pages in length, including the following:

1. A narrative statement that addresses the scope of work and describes the study design, including the field methods, the use of any Department or volunteer in-kind services, the modeling techniques to be employed, and the manner in which the results will be analyzed and presented.
2. A proposed budget not to exceed \$25,000.
3. A recent resume of the principal investigator(s) and all key personnel showing qualifications relevant to the proposed study.
4. A description of the equipment, instrumentation, and facilities that are available to the investigator(s) for use on this study.

Criteria for Selection

Proposals will be reviewed by the Vermont Department of Environmental Conservation and the Project Advisory Committee. Selection of a contractor by the Department will be based on the following considerations:

1. Technical merit of the proposal.
2. Responsiveness of the proposal to the scope of work described above.
3. Qualifications and experience of the investigator(s) regarding studies of this nature, and availability of appropriate equipment, instruments, and facilities.
4. Experience or familiarity of the investigator(s) with Lake Champlain research.
5. Cost.

Proposal Submission

One copy of the proposal must be submitted on plain white paper bound by a single staple or removable binder clip, and received by the close of business on **February 7, 2003** at the address given below. In addition, one electronic version of the proposal (MS Word preferred) should be sent by diskette or email to the same address.

Send proposals and direct all questions to:

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