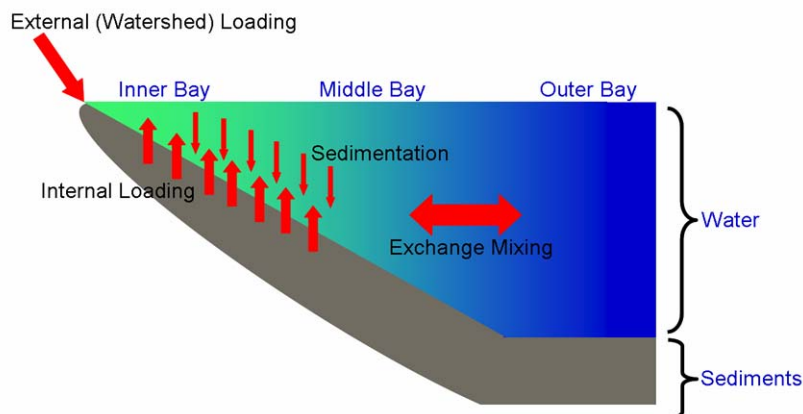


St. Albans Bay Internal Phosphorus Loading Control

The Problem

Phosphorus has accumulated in the sediments of St. Albans Bay from decades of excessive loading from point and nonpoint sources in the watershed. This sediment store of phosphorus is now recycling back into the water and is continuing to feed algae blooms in the bay in a process called “internal loading.” Water quality standards in St. Albans Bay may not be achieved until this internal phosphorus loading from the bay’s sediments declines.



The phosphorus cycle in St. Albans Bay, showing internal phosphorus loading from the bay’s sediments.

The Program

The Lake Champlain Phosphorus TMDL proposed consideration of treating the sediments with alum (aluminum sulfate) to control the internal loading. The TMDL plan indicated that such a treatment should be conducted only if it is shown to be technically feasible and environmentally acceptable, and only after progress is made in reducing the existing nonpoint source phosphorus loading from the bay’s watershed.

A St. Albans Bay sediment core study funded by Clean and Clear and conducted by the University of Vermont Department of Geology during 2004 found that a substantial reservoir of phosphorus remains in the sediments of St. Albans Bay and that this stored phosphorus has the potential to recycle back into the water of the bay for an indefinite period of time into the future¹². Given these findings, the Agency of Natural Resources initiated a feasibility study for the control of internal phosphorus loading in St. Albans Bay using Clean and Clear funds.

The feasibility study was designed to be conducted in two phases. The purpose of the first phase was to compare treatment options for the control of internal phosphorus loading in St. Albans Bay as to their feasibility, likelihood of success, environmental impacts, and cost. Phase 1 of the feasibility study was completed by ENSR Corp. in 2007¹³. The report included an evaluation of

¹² Gregory D., A. Hartmann, R. Lomonaco, and K. Oldrid. 2005. Determination of sediment phosphorus concentrations in St. Albans Bay, Lake Champlain: Assessment of internal loading and seasonal variations of phosphorus sediment-water column cycling. Prep. for Vermont Agency of Natural Resources. Waterbury, VT. <http://www.anr.state.vt.us/cleanandclear/StAlbansBaySedimentPstudy.pdf>

¹³ ENSR Corp. 2007. Feasibility Study for the Control of Internal Phosphorus Loading in St. Albans Bay, Lake Champlain. Prep. for Vermont Agency of Natural Resources. Waterbury, VT. <http://www.anr.state.vt.us/cleanandclear/StAlbansBay-FinalReport-Phase1.pdf>

several alternatives including artificial circulation, hydraulic dredging, and phosphorus inactivation in lake sediments and/or tributary inflows with chemicals such as alum.

Program Accomplishments

Phase 2 Feasibility Study

After considering the findings and recommendations in the Phase 1 study report and the advice from a Project Advisory Committee composed of basin scientists, resource managers, and local citizens, the Vermont ANR has determined that the next phase of the feasibility study should proceed. The purposes of Phase 2 will be to develop a detailed design for an in-lake treatment project including refined cost estimates, and to prepare a full environmental evaluation including all information needed for state and federal permitting. By proceeding with feasibility studies for the control of internal loading concurrently with renewed efforts to reduce nonpoint source loads from the bay's watershed, a future in-lake treatment could be closer to realization once a judgment is made that watershed loads are sufficiently reduced to justify such a treatment.

The Vermont ANR worked successfully during 2008 with the U.S. Army Corps of Engineers and the Lake Champlain Basin Program to secure technical approval and funding for the Phase 2 study through Section 542 of the U.S. Water Resources Development Act of 2000. While little progress was made during 2009, a Project Management Plan is currently in preparation by the Corps of Engineers. It is expected that the Phase 2 study will begin during 2010.

The specific treatment alternatives that will be the focus of the Phase 2 analysis will be (1) phosphorus inactivation of the sediments within the Black Creek Wetland and inner St. Albans Bay using aluminum compounds (alum and sodium aluminate), and (2) hydraulic dredging of an area limited to the open-water portion of the Black Creek Wetland.