

Lake Champlain TMDL Cost Estimate Analysis for Vermont Wastewater Treatment Facilities

Prepared by the Vermont Department of Environmental Conservation

April 9, 2015

The U.S. Environmental Protection Agency (EPA) has proposed a set of phosphorus wasteload allocations for the new Lake Champlain Total Maximum Daily Load (TMDL) that would apply to Vermont wastewater treatment facilities in the Lake Champlain Basin. EPA's proposed allocations are dependent on the size of the facility, as follows.

Size of Facility	Basis for Phosphorus Wasteload Allocation
<u>Large</u> : Greater than or equal to 0.2 million gallons per day permitted flow	Annual mass load limit calculated at 0.2 milligrams per liter effluent phosphorus concentration at the permitted flow, or currently permitted phosphorus load, whichever is less
<u>Medium</u> : 0.1 to 0.2 million gallons per day permitted flow	Annual mass load limit calculated at 0.8 milligrams per liter effluent phosphorus concentration at the permitted flow, or currently permitted phosphorus load, whichever is less
<u>Small</u> : Less than 0.1 million gallons per day permitted flow	Retain the currently permitted annual mass load

Under EPA's proposal, these new wasteload allocations would apply to facilities in four "targeted" lake segment watersheds (Main Lake, Burlington Bay, Shelburne Bay, St. Albans Bay) where the currently permitted wastewater loads are a larger proportion (>15%) of the total base phosphorus load from all sources. The new limits would also apply in three other "challenging" watersheds (Missisquoi Bay, South Lake A and B) where especially high levels of nonpoint source reductions are needed. Facilities in all other Vermont lake segment watersheds would retain their currently permitted phosphorus load limits.

The Facilities Engineering Division of the Vermont Department of Environmental Conservation (DEC) prepared an estimate of the capital cost of facility upgrades to achieve the phosphorus limits proposed by EPA.¹ The cost analysis considered factors including the following.

- Available pilot testing and operational data
- Available project bid costs
- Existing treatment equipment at each facility
- Necessary redundancy of treatment systems
- Organic capacity at select, existing facilities
- Consistent construction assumptions regarding building footprint (with accommodation for accessibility, maintenance, and storage), concrete work, structural steel work, environmental systems (e.g., HVAC and electrical), and yard piping

¹ Vermont Department of Environmental Conservation. April 8, 2015. Lake Champlain TMDL: 2014 Cost Estimate Analysis for Vermont Wastewater Treatment Facilities. Montpelier, VT. 33pp.
http://www.anr.state.vt.us/dec/fed/design/docs/TMDL/LakeChamplainTMDL_2014CostEstimateAnalysisForVermontWWTFs.0409.15.pdf

- Cost requirements for permitting and green infrastructure, federal safety (OSHA) requirements, and provisions for some additional site-specific needs

The capital construction costs (2014 dollars) to achieve the effluent phosphorus limits proposed by EPA are summarized below, based on estimates provided in Appendix B of the DEC cost report. Annual operational costs are not included in these estimates. These are potential capital costs if all facilities needing upgrades to achieve the EPA’s proposed limits at their full design flows undertook construction projects.

Lake Segment Watersheds	Capital Cost	Number of Facilities Incurring Costs
Targeted watersheds: Main Lake, Shelburne Bay, Burlington Bay, St. Albans Bay	\$100,500,000	14
Challenging watersheds: Missisquoi Bay, South Lake B, South Lake A	\$26,200,000	8
Total	\$126,700,000	22

There are ways these potential expenditures could be reduced or deferred. For example, if facilities are required to perform phosphorus upgrades only when their phosphorus wasteload exceeds 80% of their new permitted values, near-term costs could be reduced to \$78 million. Optimization of process methods and controls could provide another way to avoid capital costs at some facilities if pilot studies, modeling, or other evaluations demonstrated that phosphorus limits could be achieved without an extensive construction project.