



April 15, 2016

Padraic Monks
Program Manager
Stormwater Program
Watershed Management Division
VT Dept. of Environmental Conservation
1 National Life Drive, Main 2
Montpelier, VT 05620-3520

Sent via electronic mail

Re: Comments on the Draft Vermont Stormwater Management Manual

Dear Padraic,

Conservation Law Foundation, Vermont Chapter of the Sierra Club, Vermont Council of Trout Unlimited, Lake Champlain Committee, Connecticut River Watershed Council, Lintilhac Foundation, Lewis Creek Association, and Lake Champlain International submit the following comments to the Department of Environmental Conservation (DEC) on the draft Vermont Stormwater Management Manual (draft VSMM).

Stormwater runoff from rooftops, parking lots, and roadways is a major contributor to the degradation of water quality and increased flood risks across Vermont. Improperly managed impervious surfaces collect pollutants such as dirt, de-icing salts, sand, oil, antifreeze, pathogens, metals, heat, and nutrients, and flush this foul brew of pollutants into rivers and streams by concentrating flows of rainwater and snowmelt.¹ They also increase flooding risks and harm aquatic habitat by depriving the natural landscape of its ability to absorb and store rainwater, thereby rapidly and artificially increasing water levels in nearby rivers and streams.

Increased precipitation and more extreme weather events associated with the changing climate will only exacerbate these compounding problems. Updates to the VSMM must play a critical role in significantly improving how developers address pollution and flood control when undertaking projects that alter the landscape as well as strengthening Vermont's resilience to the mounting challenges of climate change.

Developed lands, on an acre-per-acre basis, generate a disproportionate amount of the nutrients and sediment discharged into our waters as compared to other land use types.² In the Vermont portion of the Lake Champlain basin, developed lands contribute 18 percent of the phosphorus load;³ the main cause of the toxic blue-green algae blooms plaguing Lake Champlain and other public waters each year.

Despite the water quality concerns with stormwater, DEC has chosen to leave the vast majority of existing developed land unregulated by state or federal stormwater permits.⁴ Additionally, an unknown amount of new development falls below the default thresholds that automatically trigger stormwater permitting requirements enforced by DEC.⁵ Considering the broad swath of developed land that DEC has historically left unaccounted for in applying its authority and responsibility under clean water laws,⁶ it is critical that the

¹ Water Quality Remediation Implementation and Funding Report, Prepared for the Vermont General Assembly in Accordance with Act 138, (Jan. 14, 2013) Section 19, pg. 4. (hereinafter Act 138 Report).

² Act 138 Report pg. 11.

³ Phosphorus TMDLs for Vermont Segments of Lake Champlain, (Aug. 14, 2015) pg. 18 tbl. 3. (hereinafter Draft 2015 TMDL).

⁴ Existing Agency permitting structure only manages approximately 10 percent of impervious surfaces in the state. Padraic Monks, DEC Brownbag Lecture. *Managing Stormwater Impact from New Development* (Jan 28, 2016).

⁵ Act 138 Report pg. 11.

⁶ Both federal and state laws provide DEC with authority to regulate stormwater discharges regardless of the size of impervious surface from which they originate. Under federal Clean Water Act regulations containing so-called "residual designation authority" DEC has the "authority and responsibility" to designate discharges for permitting if they are significant contributors of pollutants to, or if they contribute to ongoing water quality violations in, receiving waters. In re NPDES Stormwater Petition, 2006 VT 91 ¶ 18. Similarly,

VSMM require strict pollutant controls on the limited area currently subjected to permitting programs.

DEC has committed to updating the VSMM “to increase the use of green-stormwater infrastructure practices, and to *increase the required levels of phosphorus removal in approved practices*” (emphasis added).⁷ DEC has further pledged that the final version of the VSMM will “employ state-of-the-art stormwater BMPs designed to *maximize phosphorus removal*” (emphasis added).⁸ DEC’s focus on phosphorus removal is appropriate given the requirements in federal and state laws to reduce phosphorus pollution flowing into our waterways and threatening public health.

Under the federal Clean Water Act (CWA), Vermont must ensure that Lake Champlain meets water quality standards. CWA § 303(d)(1)(C) 33 U.S.C. § 1313(d)(1)(C). The lake, which is impaired by phosphorus pollution, has an annual mean total phosphorus concentration 33.8 percent above the legally compliant level.⁹ To achieve attainment, the State must reduce phosphorus loading from developed lands by 24.1 percent.¹⁰ Act 64, or Vermont’s Clean Water Act, further highlights DEC’s obligation to “reduce the adverse effects of stormwater runoff” and assure compliance with water quality standards 10 V.S.A. § 1264(a)(2)(A) and (f)(1)(A).

Unfortunately, the draft VSMM does not adequately address phosphorus pollution and is therefore inconsistent with DEC’s legally enforceable phosphorus reduction commitments. Before finalizing the VSMM, DEC should strengthen the water quality treatment standard by (1) requiring stormwater treatment practices (STP) remove 80 percent of the total phosphorus load; and (2) by requiring STPs capture and treat 100 percent of the water quality volume from redeveloped impervious areas.

The VSMM should set the water quality treatment standard at removing 80 percent of the total phosphorus load.

The draft VSMM sets the water quality treatment standard at removing 50 percent of the total phosphorus (TP) load, a mere 10 percent increase from the 2002 VSMM. This minimal increase in TP removal is neither sufficient to meet the significant phosphorus reductions laid out in the Lake Champlain TMDL nor does it reflect “state-of-the-art stormwater BMPs designed to maximize phosphorus removal,” as promised by DEC in the Phase I Plan.¹¹

longstanding state stormwater management rules authorize DEC to require a permit for “[a] discharge from any size of impervious surface if the Secretary determines that treatment is necessary to reduce the adverse impacts of the discharge due to the size of the impervious surface, drainage pattern, hydraulic connectivity, installation or modification of drainage or conveyance structures, location of the discharge, existing stormwater treatment, or other factors identified by the Secretary.” Department of Environmental Conservation, Stormwater Management Rule § 18-302(a)(5).

⁷ Vermont Lake Champlain Phosphorus TMDL Phase I Implementation Plan, (May 29, 2014) pg. 83. (hereinafter Phase I Plan).

⁸ Phase I Plan pg. 83.

⁹ Draft 2015 TMDL pg. 44 tbl. 8.

¹⁰ *Id.*

¹¹ Phase I Plan pg. 83.

Rather, an 80 percent TP removal standard is justified by the substantial mandates set forth in the Lake Champlain TMDL and is supported by DEC's commitments in the Phase I Plan. "State-of-the-art" stormwater treatment practices (STP) that infiltrate and filtrate can achieve an 80 percent TP removal rate.^{12,13,14} The draft VSMM indirectly embraces an 80 percent removal standard by requiring that infiltration – practices known to have high removal efficiencies – be "first considered."¹⁵ However, this vague statement has unclear outcomes and cannot substitute a strong water quality standard.

Where infiltration alone is infeasible, a stringent TP removal standard will drive greater implementation of enhanced filtration practices, multiple STPs in series (including infiltration practices where possible in combination with filtration practices), and practices with soil amendments. A promising soil amendment is water treatment residuals (WTRs), which bind to phosphorus to further improve the removal efficiency.^{16,17} According to the Minnesota Pollution Control Agency; soil amendments to enhance phosphorus sorption typically do not increase bioretention maintenance needs. In addition, since WTRs are byproducts of the water treatment process they can often be procured at little or no cost.¹⁸

Setting a stringent water quality treatment standard is beneficial for a number of reasons. First, it lifts the burden from DEC to prioritize certain practices over others – since phosphorus removal efficiencies will dictate acceptable STPs. Second, all acceptable STPs

¹² See Vermont Stormwater Management Manual Volume II, (August 2002) pg. 166 tbl D.3. (Total phosphorus removal efficiency of 100 percent for infiltration trenches and 83 percent for dry swales. Bioretention filtering systems have a removal efficiency of 65 percent, which could be potentially improved with additional treatment practices or soil amendments).

¹³ See University of New Hampshire Stormwater Center 2012 Biennial Report pg. 11. (Total phosphorus (TP) removal efficiencies for a manufactured infiltration unit and permeable pavement range from 81 to 99 percent. While bioretention and subsurface gravel wetlands only show TP removal efficiencies between 34 and 58 percent, these efficiencies could be improved with soil amendments. Moreover, retention and detention ponds show zero treatment for TP).

¹⁴ See Pennsylvania Stormwater Best Management Manual, Appendix A pg. 8 tbl. A-4. (Total phosphorus removal efficiencies for infiltration and filtration practices, including porous pavement, infiltration basins, bioretention, and practices with soil amendments reach 85 percent).

¹⁵ Draft Vermont Stormwater Management Manual Volume I, (March 1, 2016) pg. 2-3.

¹⁶ See, e.g. O'Neill, S. W., and A. P. Davis, A. P. 2012a. *Water treatment residual as a bioretention amendment for phosphorus. I. Evaluation studies.* J. Environ. Eng. 138(3): 318–327; O'Neill, S. W., and A. P. Davis. 2012b. *Water treatment residual as a bioretention amendment for phosphorus. II. long-term column studies.* J. Environ. Eng., 138(3), 328–336. (Drinking-water treatment residuals (WTRs) are primarily sediment, metal (aluminum, iron or calcium) oxide/hydroxides, activated carbon, and lime removed from raw water during the water purification process. WTRs are increasingly being used to control phosphorus in soils where phosphorus leaching may be problematic for water quality. O'Neill and Davis (2012a and 2012b) recommend a bioretention soil media of 5 percent WTR, 3 percent triple-shredded hardwood bark mulch, and 92 percent loamy sand for phosphorus reduction).

¹⁷ See "Stormwater Manual Discussion." Personal interview with Andres Torizzo, Principal Hydrologist at Watershed Consulting Associates. March 11, 2016. (There are some concerns with slag for its potential environmental impacts, including changes in pH to the ecosystem. Other amendments like Imbrium Sorptive@MEDIA are prohibitively expensive, whereas the availability of iron filings may be limited).

¹⁸ Minnesota Pollution Control Agency, *Soil Amendments to Enhance Phosphorus Sorption.* (October 2014), Available at: <http://goo.gl/4r2Ghy>.

remain within the toolbox for developers to use, only now practices with poor TP removal efficiencies must be developed in series, often referred to as a “treatment train,” or with amendments to improve their performance. Third, a progressive phosphorus standard accommodates the static nature of the VSMM and will remain relevant into the future. Finally, and most importantly, strict controls on phosphorus discharges are necessary to clean up Lake Champlain and meet water quality standards.

In recognition of possible site constraints, DEC may allow for variances where the 80 percent standard simply cannot be met. However, in this case, DEC should be prescriptive in dictating which STPs are acceptable. We recommend DEC establish a hierarchy of STPs, in which practices that infiltrate and provide filtration are prioritized over retention and detention practices.¹⁹ Specifically, DEC should mandate that bioretention, dry swales, gravel wetlands, infiltration trenches and basins, filtering systems, green roofs, and permeable pavement practices be prioritized over wet swales and wet ponds. We believe DEC is already developing a prioritization scheme, and we welcome the opportunity to engage in this process.

The VSMM should set the water quality treatment standard at capturing and treating 100 percent of the water quality volume from redeveloped impervious areas.

The water quality treatment standard is the only standard the draft VSMM applies to redevelopment. To meet this standard, developers may design a stormwater treatment practice that captures and treats 50 percent of the water quality volume from the redeveloped impervious area. While this is a marked improvement over the 20 percent requirement in the 2002 VSMM, it misses the opportunity to significantly reduce phosphorus loading from redevelopment.

To meet this standard, developers may collect runoff from and treat only half of the redevelopment area, thereby allowing half of the stormwater to remain untreated. This poses an unacceptable risk for pollutant loading into Vermont’s waterways. Setting a strict water quality standard for redeveloped land is necessary to meet the State’s water quality targets and is appropriate considering water quality is the only standard applied to redevelopment.

If DEC sets this standard to anything less than 100 percent, the VSMM should clarify that STPs must treat runoff from the entire contributing impervious area even if designs do not capture and treat to a 1-inch event. For example, a 50 percent standard would allow STPs to treat the volume from the entire site for the 0.5-inch storm.

¹⁹ See Philadelphia Stormwater Management Guidance Manual (July 2015) pg. 39. (The city of Philadelphia has developed a hierarchy of STPs, in which bioinfiltration, bioretention, porous pavement, and green roofs are prioritized. These practices are ranked highest for their ability to infiltrate stormwater and provide triple bottom line benefits while being cost effective and long lasting).

Conclusion

We believe the draft VSMM does not adequately address phosphorus pollution. At the March 15, 2016 hearing on the draft VSMM, DEC staff noted that despite the low phosphorus removal standard, the Agency “expects sites that can meet a higher standard would do so.” Given the federal and state mandates to significantly reduce phosphorus pollution from developed lands, the Agency must do more than just hope that some developers will go beyond the standard to achieve statewide reductions. Instead, we need a stringent water quality treatment standard that guarantees significant phosphorus reductions as required by law. We urge DEC to incorporate our comments before engaging in the formal rulemaking process.

Sincerely,



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Marty Illick
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A handwritten signature in black ink, appearing to be 'D-L' with a horizontal line extending from the 'L'.

James Ehlers
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cc. Kevin Burke, Emily Schelley, and Chip Gianfagna