

Charles River Watershed Association
190 Park Road
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Online Phosphorus Trading System

Final Report

Project No. 11-09/319
319 Nonpoint Source Competitive Grants Program
Massachusetts Department of Environmental Protection

Table of Contents

A. Project Snapshot	1
B. Descriptive Project Summary	2
C. Financial Summary	3
D. Description of Each Activity	5
E. Lessons Learned	7
F. Attachments	9

A. Project Snapshot

Project Number and Title: Project No. 11-09/319, Online Phosphorus Trading System

A1. Project start date: April 26, 2011

A2. Date closed: June 30, 2014

A3. Basin and HUC 12 subwatershed: Towns of Bellingham, Franklin, and Milford within Upper Charles River: HUC12 010900010601, Charles River-headwaters to Chicken Brook; HUC12 010900010602, Charles River-Chicken Brook to Stop River.

A4. Segment and/or waterbody number(s):

MA72-01–headwaters MA72016–Milford Pond

MA72-33–Outlet Milford Pond to Milford WWTF

MA72-03–Milford WWTF to outlet Box Pond

MA72-04–Outlet Box Pond to inlet Populatic Pond

MA72-096–Populatic Pond

A5. Status of waterbody: Segments MA72-01 and MA72-33: Category 4A, Category 4a waters, TMDL is complete; MA72-03, MA72-04 and MA72-096, Category 5, waters requiring a TMDL (waterbody remains listed, although some TMDLs are complete).

A6. Priority Pollutant(s) targeted: Phosphorus

A7. Estimated Annual Pollutant removal: N/A

A8. BMPs installed, number and type: N/A

B. Descriptive Project Summary

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 11-09/319

PROJECT TITLE: Online Phosphorus Trading System
NPS CATEGORY: Urban Runoff
INVESTIGATOR: Charles River Watershed Association
LOCATION: Charles River Watershed, Massachusetts
TARGETED POLLUTANTS: Phosphorus

Description:

Charles River Watershed Association (CRWA) has developed an online phosphorus trading system, Blue Cities Exchange (BCE), to reduce total phosphorus loads to the Charles River, to assist property owners subject to anticipated new stormwater general permits to be issued for the Charles River by US EPA Region 1, and to support cost-effective stormwater management strategies. BCE is designed to provide a simple online portal for property owners to understand their permit obligations, undertake conceptual design studies of their sites, and identify potential partners with whom to trade for phosphorus pollution reduction credits should they choose to do so. This 319 NPS Project helped improve and expand BCE to the extent possible during the current phase of permit development.

Objectives

The overall objectives of BCE include: enhance implementation of regulatory programs; support a market-based trading system for phosphorus reduction credits; incentivize stormwater management on both regulated and unregulated properties; provide an easy-to-use online system to evaluate options for potential stormwater management sites; improve the pilot BCE program so it can be expanded.

Methods Employed

To accomplish the objectives of this program, the following tasks were undertaken in this project: Quality Assurance and Project Evaluation; Expand Online System Extent; Develop Expanded Online Trading Tool; Improve Website Security, Stability, Appearance, and Scope; and Reporting and Project Oversight. Under these tasks, CRWA has expanded and improved the BCE website; conducted demonstrations with potential site users, regulators and financing experts to solicit feedback; and explored a variety of administrative approaches to implementation of a fully functional online trading program, integrating BCE and stormwater trading with the general permit program.

Project Results

The project was successfully completed, on time and on budget. All elements of the Scope of Work were completed (see Tasks, below). There was no pollutant load removal anticipated. Because EPA has not yet issued new stormwater general permits, the BCE site is not available to support actual trades. See discussion in Lessons Learned section of this report.

Final Project Cost: \$191,705.87
Final Funding : \$107,614 Section 319 NPS Program Grant
\$ 84,091.87 Matching funds provided by CRWA

PROJECT COMPLETE

DURATION: 2011-2014

C. Financial Summary

The final actual budget expenses and income sources are shown below. The primary changes from the proposed budget were a shift in the sources of the matching funds, and a resulting shift in 319 grant fund expenditures from a subcontractor to CRWA labor. The original contract budget follows.

Match Documentation

By the end of the project, the 40% match was slightly exceeded, with the final match equaling 44% of the total project budget. The matching process was somewhat difficult to manage, however, because the full original anticipated match was not actually available as a match. CRWA worked hard throughout 2012 to identify additional sources of match. CRWA was able to obtain \$5,360 as an in-kind labor match from our subcontractor ASA. We were also allowed to use \$10,000, a portion of some settlement funds that were received as a settlement of a lawsuit brought against a private company for stormwater violations, as matching funds for this project. Finally, we were able to obtain \$10,000 in matching funds from a private foundation grant obtained in December 2013.

**Online Phosphorus Trading System
Project # 11-09/319
Final Project Budget – Actual Expenses**

Expense Item	319 Amount	Non-Federal Match	Total
Salaries			
CRWA Salaries:	\$76,926.07	\$ 9,898.92	
Matching:			
MET		\$ 48,000.00	
CRWA (Varney)		\$ 10,000.00	
CRWA (Eaglemere Fdn.)		\$ 10,000.00	
Subtotal Salaries & Matching	\$ 76,926.07	\$ 77,898.82	\$154,824.89
Subcontractual			
Web Developer	\$ 29,400	\$ 5,360.52	\$ 34,760.52
Subtotal Subcontractual	\$ 29,400	\$ 5,360.52	\$ 34,760.52
Supplies & Misc			
Materials and supplies	\$ 1,287.93	\$ 752.94	\$ 2,040.87
Travel	\$	\$ 79.59	\$ 79.59
Subtotal Supplies & Misc	\$ 1,287.93	\$ 832.53	\$ 2,120.46
Totals	\$ 107,614	\$ 84,091.87	\$191,705.87
Percent	56%	44%	100%

Attachment B
Budget Amendment #2
Online Phosphorus Trading System
Project # 11-09/319

Expense Item	319 Amount	Amendment	Non-Federal Match	Total
Salaries				
CRWA Salaries:	\$71,544	\$76,926.07	\$ 0	\$76,926.07
Executive Director (\$100-\$120/hr)				
Senior Managers (\$75-\$85/hr)				
CRWA staff (\$35-\$40/hr)				
General Counsel (\$95-\$105/hr)				
<i>Project Manager (\$40-\$60/hr)*</i>				
Matching:				
MET	\$0	\$0	\$ 48,000	\$ 48,000
Eaglemere Fdn.	\$0	\$0	\$ 10,000	\$ 10,000
Varney	\$0	\$0	\$ 10,000	\$ 10,000
Subtotal Salaries & Matching	\$ 71,544	\$76,926.07	\$ 68,000	\$ 144,926.07
Subcontractual				
Web Developer	\$ 35,000	\$29,400	\$ 5,360	\$ 34,760
Subtotal Subcontractual	\$ 35,000	\$29,400	\$ 5,360	\$ 34,760
Supplies & Misc				
Materials and supplies	\$ 990	\$1,287.93	\$ 300	\$ 1,587.93
Travel	\$ 80	\$0	\$ 0	\$ 0
Subtotal Supplies & Misc	\$ 1,070	\$1,287.93	\$ 300	\$ 1,587.93
Totals	\$ 107,614	\$ 107,614	\$ 73,660	\$ 181,274
Percent	60 %	60%	40%	100%

The Department will retain 10% of the total maximum obligation of the 319 grant funds or the final invoice submitted by the Grantee, whichever is greater, until all contract provisions are satisfied and final reports and other products are delivered and accepted. This 10% retainage shall be reflected on each invoice submitted by the Grantee and will be cumulative in the amount of \$10,761 (10% of the contract amount).

The Fair Share goals for the project are at the Services rate of 4.65% MBE and 16.03%WBE on the total project dollars. To comply with M/WBE participation goals it is anticipated that \$8,398 for MBE and \$28,952 for WBE will be expended.

* Amended May 9, 2012, to add CRWA Project Manager line – approved J Peirce

* Amended July 16, 2014, to reconcile actual project expenditures. Approved M. Harper

D. Description of Each Activity

The project successfully expanded and enhanced the BCE website, adding features to enhance the user interface, as well as improve and strengthen the website's data internal structure and code. Outreach meetings with various potential user groups, including consultants, government officials, financial specialists, and business owners led to modifications in the user-interface, Frequently Asked Questions and process flow of the website. Significant research was conducted into the options for administration of the trading program, including evaluating other trading programs across the country, conducting analysis of real estate and other legal issues. The improvements of the website are outlined task-by-task below.

Task 1: Quality Assurance and Project Evaluation

100% Complete

This project had no monitoring or modeling components; no QAPP was required. Project evaluation is based upon completion of scope of work (complete) and functionality of BCE website (expanded, stable, and secure).

Task 2: Expand Online System Extent:

100% complete

The online parcel database was updated to include the town of Milford. Prior to this grant project, the parcel database included public data for the towns of Franklin and Bellingham from five sources: a) tax records including parcel owner, parcel tax ID, physical address and mailing address (MASSGIS 2013), b) MASSGIS 2005 land use database (MASSGIS 2005), to determine land type, c) the Upper and Middle Charles TMDL (CRWA 2007) for loading rates for particular land uses, d) NRCS soils data, including soil type and soils properties (NRCS 2012), and e) impervious cover data (MASSGIS 2007). During this grant period, CRWA obtained these data sets for the town of Milford and used them to extend the parcel database. The extended database was analyzed to confirm the accuracy of the calculations and to ensure matched records with EPA's database of parcels potentially subject to regulation. The database, expanded to include the Town of Milford, is now referenced on the BCE website.

Task 3. Develop Expanded Online Trading Tool:

100% complete.

This task focused on expanding upon the basic skeleton structure of the online trading system. CRWA worked with EPA region 1 staff to develop a complex conceptual process flow for the trading program, including regulatory steps, and potential permit interaction with the BCE website. See Figure 1, page 6. CRWA also outlined interactions users would have with third parties such as design engineers for stormwater controls. CRWA determined that further development of the trading system structure (Task 3, subtask a) would require either the finalization of the residual designation permit and/or further determinations on stormwater permits from EPA region 1 staff to finalize the details of the proposed trading system. At the termination of this grant project, CRWA has not received the information needed to further develop the trading components of this project beyond the conceptual layout presented to date. The trading program in subtask a, and the administrative tools in subtask d, were developed to the conceptual stage. A conceptual trading page is shown in the website, and the administrative tools are shown as links on the administrative tools page of Blue Cities Exchange, available only to users that are registered and signed-in to the online system. A memo outlining the legal and administrative issues is attached to this report.

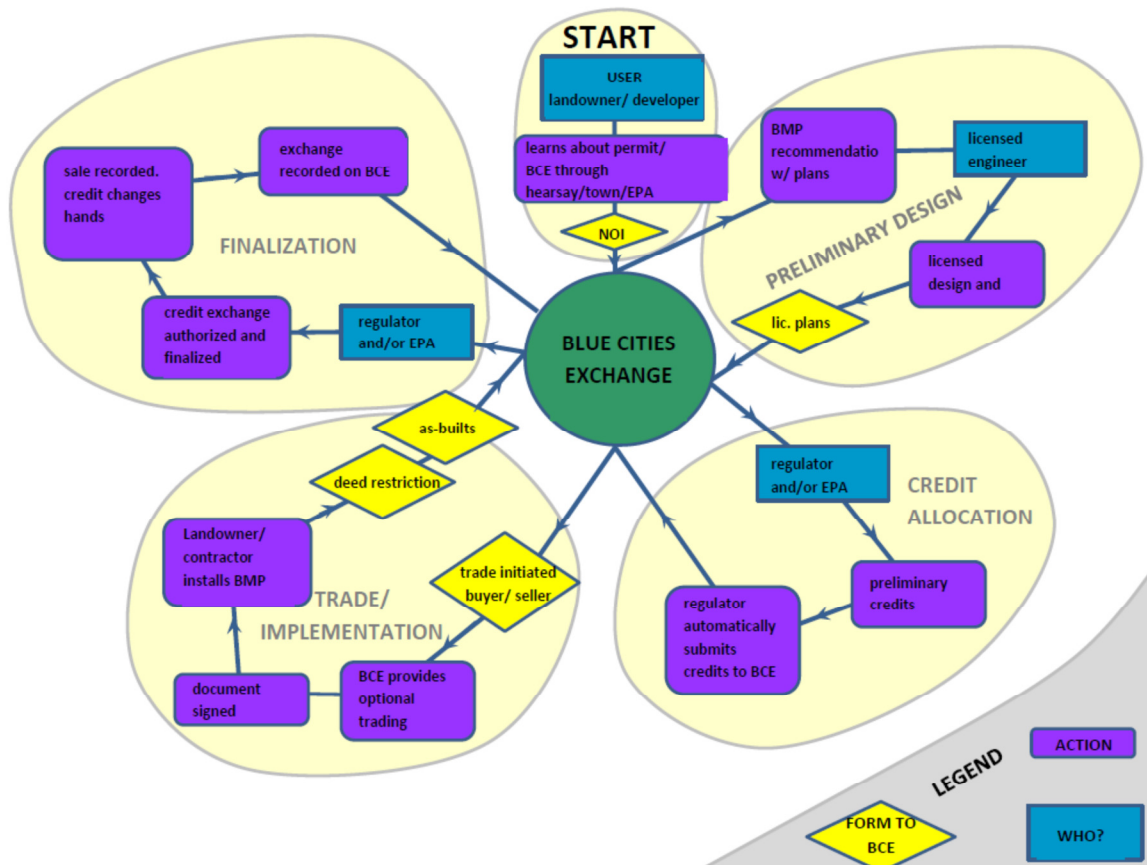


Figure 2. Conceptual Diagram of Phosphorous Trading Program in the Charles River Watershed, as developed by CRWA and EPA Region 1 Staff

CRWA worked extensively to develop the site evaluation and costing tool to include new features (subtasks b, c). A soils layer was added on the parcel location map so that users can view all the NRCS soil types that have been determined for a particular parcel. User recommendations were enhanced using advanced programming logic, in order to give users accurate and helpful recommendations on selecting stormwater controls or determining if buying credits was a viable option, based on soil infiltration and estimated cost of stormwater controls. The costing estimates are based on practical research on stormwater controls, and estimate the cost of a particular stormwater control based on user inputs for desired pollution removal efficiency and development density.

CRWA also tested the website in a number of venues (Task 3, subtask e), with a variety of testers. First, CRWA tested the site internally with its staff members. Next a testing focus group of CRWA Board of Directors tested the site and made a number of suggestions regarding usability and functionality, many of which have been incorporated into the site. CRWA also had several environmental consultants, financing experts and real estate professionals test the site and provide feedback. Although CRWA planned to present the website to a focus group comprising members of the business and development communities in the upper watershed, towards the close of this project it was determined that until a new draft stormwater permit is issued by EPA, a focus group would not be helpful to the project. CRWA still plans to work with focus groups in the future, but only after the draft permit has been issued and there is a clearer understanding in the public and private sectors of what the anticipated impact of new regulations will be, and thus why a trading program might be of interest.

Task 4. Improve Website Security, Stability, Appearance, and Scope:
100% complete

CRWA worked with a web development consultant to improve the site's user interface and appearance, as well as to correct several persistent errors and occasional problems with instability on the site. The result was the development of two user tracks that allow lay users and experts to use two different interfaces. Lay users are guided through the site evaluation tool and explained options for trading, where expert users have the option to view stormwater control options in a more robust view. A glossary was also developed, accessible through the online help section, or by rolling over bold words throughout the website content which displayed a pop-up definition. Through the user interface improvements, the site was tested extensively for functionality problems, and any issues were resolved, thus improving site stability. The website also includes a user sign-in feature that restricts parcel owner names and parcel IDs from unregistered users, as well as the access to an administrative tool page. The site was developed using advanced web-scripting techniques and GIS serving technologies that enhance the site security and stability. A "how to" video was developed, available on the home page of the site, that walks users through the use of the site with a simple slide presentation and audio track.

Task 5: Reporting and Project Oversight:

100% complete

CRWA completed the reporting requirements for this grant, submitting quarterly reports each quarter between for periods from January 1, 2012 to June 2014, as well as complying with final report and acknowledgement of support requirements. All subcontracting was conducted in accordance with CRWA's procurement policy. CRWA's accounting process is audited each year by an independent auditor, and Audited Financials are available upon request.

E. Lessons Learned

- Discussions with potential users of the BCE website, regulators and financial experts all support the premise that a simple, effective phosphorus trading platform would help achieve water quality standards and reduce nonpoint source pollution at a lower overall cost. The extremely variable costs of compliance with water quality standards between different sites create a natural potential market for trading phosphorus reduction credits if and when all sites are required to meet those standards. However, trading in the water sector needs to be driven by a strong regulatory program, with clear requirements, timelines and compliance enforcement.

The trading process is highly complex, and involves risk to all parties which must be understood and accounted for. A major challenge of any trading program is to provide as simple a system as possible so as to include the greatest number of potential parties in trades, while minimizing risk by providing clear lines of responsibility and transparency. A successful phosphorous trading system in the Charles River Watershed will have a complex process flow and require multiple regulatory steps, many with the EPA Region 1 Office, and Massachusetts DEP. The implementation of stormwater controls will in some cases require compliance with the Massachusetts Wetlands Protection Act, the Massachusetts Environmental Protection Act (MEPA) and interaction with the DEP. Because much of the trading program requires regulatory compliance, the program's success requires significant collaboration and support from both DEP and EPA.

To date, EPA Region 1 has not issued a new stormwater general permit for private property owners (although such a permit has been anticipated since the draft permit was issued in 2010). EPA's Small Municipal Separate Storm Sewer System (MS4) Permits in Massachusetts, due to be revised in 2008, have also not yet been finalized. For this project, the lack of final permits meant that CRWA was unable to develop final trading parameters, and thus the administrative tools and trading pages of the BCE site remain conceptual in nature. However, the research, preparation and conceptual design that was undertaken during this project in anticipation of final permits will mean that when the stormwater general permits are finalized, and/or when a different regulatory stormwater structure is put into place in Massachusetts, the process for finalizing trading and integrating trades into permits via the BCE site is well laid out.

- Website usability is very important, especially when presenting technically complex concepts. The trading program in itself is a new idea to many people and requires careful explanation. When coupled with explaining

how to use stormwater controls, Blue Cities Exchange is tasked with making some very complex concepts accessible to lay users. CRWA learned that simple presentation and basic-level explanation of concepts was necessary in order to allow the website to reach a large audience. Through this realization, the concept of having two user tracks was developed: one for introductory users and one for professional users.

Increasing site usability through website features, such as interactive sliders, pop-ups, and sidebars, requires many hours of work at the site planning and web development levels. The use of experienced programmers is necessary for this level of website development.

- Finding M/WBE contractors for highly technical scientific web development is a difficult task. In the grant proposal for this project, CRWA hoped to find a M/WBE partner for the web development of the site. However, when reaching out to eligible contractors, there were few that had experience in the type of programming the site required, and of those few, none had the level of technical and scientific knowledge necessary for the task. Thus, it was necessary for CRWA to request a waiver from its M/WBE responsibilities for the project. CRWA was able to use a M/WBE business to develop the instructional video for the site.

F. Attachments

1) Map of watershed and project locus

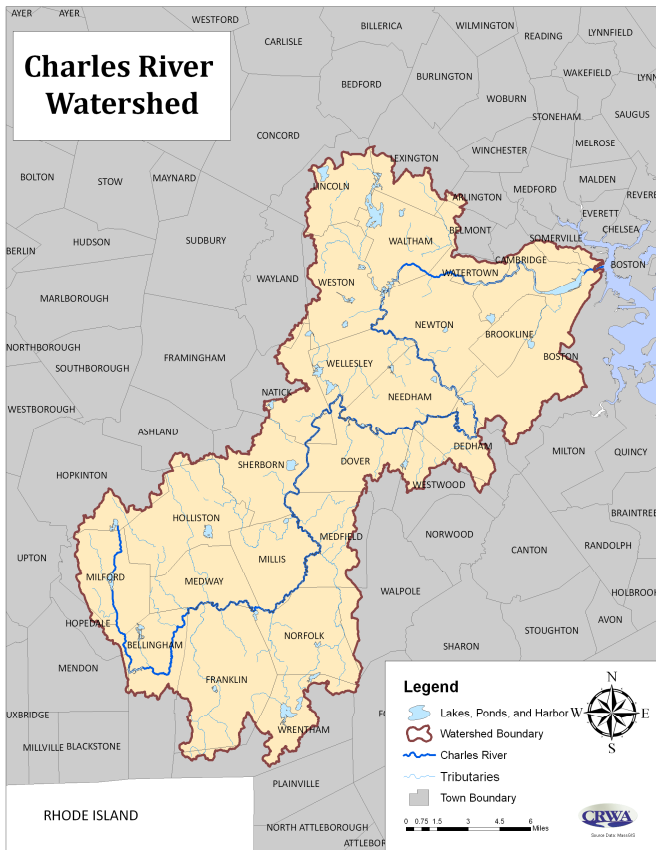


Figure 1. Map of Charles River Watershed with municipal boundaries and water bodies including the Charles River and its Tributaries. The Charles River has a length of 80 miles, and its watershed covers 308 square miles and 35 towns.

2) Water Quality Trading Memo

Stormwater Phosphorus Reduction Trading in Massachusetts
Charles River Watershed Association¹
July 30, 2014

1. Background

With new Municipal Separate Storm Sewer Systems (MS4) permits on the horizon for Massachusetts that will contain requirements that communities subject to a nutrient total maximum daily load (TMDL) develop phosphorus control plans to reduce their loadings, and EPA's exercise of its residual designation authority for three upper Charles River Watershed towns (Bellingham, Milford and Franklin)² to require owners of industrial, commercial or high density residential properties with two or more acres of impervious surface to control stormwater runoff from these sites, it is an auspicious time for adoption and implementation of a trading program. Trading will facilitate compliance with the new permits, help to achieve MA water quality standards (WQSs) and nutrient TMDL limits,³ reduce the costs of compliance, foster efficiency in meeting WQSs at lower cost, create "incentives for voluntary reductions and promote watershed-based initiatives." *Water Quality Trading Policy* (EPA 2003). As EPA notes, "[m]arket-based approaches can also create economic incentives for innovation, emerging technology, voluntary pollution reductions and greater efficiency in improving the quality of the nation's waters." *Id.* and *see also*, Part II. Trading Objectives.

¹ This memo does not provide legal advice; opinions expressed herein are solely those of CRWA. The memo is not intended to be exhaustive, but rather as a starting point for discussion of stormwater trading with MassDEP and EPA.

² Clean Water Act (CWA), section 402(p); <http://www.epa.gov/region1/charles/pdfs/RODfinalNov12.pdf>. *See also*, *Final Total Maximum Daily Load for Nutrients in the Lower Charles River Basin, Massachusetts* (2007) and *Final Total Maximum Daily Load for Nutrients in the Upper/Middle Charles River, Massachusetts* (2011) (collectively, Nutrient TMDLs).

³ *See*, MA Surface Water Quality Standards (WQS) at 314 CMR 4.05(5)(c):

Nutrients. Unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses and shall not exceed the site specific criteria developed in a TMDL or as otherwise established by the Department pursuant to 314 CMR 4.00. Any existing point source discharge containing nutrients in concentrations that would cause or contribute to cultural eutrophication, including the excessive growth of aquatic plants or algae, in any surface water shall be provided with the most appropriate treatment as determined by the Department, including, where necessary, highest and best practical treatment (HBPT) for POTWs and BAT for non POTWs, to remove such nutrients to ensure protection of existing and designated uses. Human activities that result in the nonpoint source discharge of nutrients to any surface water may be required to be provided with cost effective and reasonable best management practices for nonpoint source control.

Because compliance will necessitate collection and treatment of stormwater for phosphorus and other pollutant removal, and best management practices (BMPs) using infiltration and vegetative treatment are generally the most effective at removing phosphorus pollution, the permits will promote green infrastructure and low impact development techniques (LID). These BMPs will also protect drinking water supplies in the three upper watershed towns by recharging aquifers, provide increased base flow to rivers and streams, reduce flooding and enhance resiliency to extreme storm events, and provide green jobs.⁴

A landowner that goes beyond compliance in reducing runoff and nutrient loading (or is unregulated) can generate credits (credit seller, or generator) at lower pollution control costs that could be sold to a regulated entity required to reduce phosphorus loading from his property (credit buyer) pursuant to regulatory requirements (stormwater reduction credits, or SRCs).⁵ We envision that generally these stormwater trades will be nonpoint to nonpoint. Trades would likely involve private property owners, municipalities and governmental agencies subject to new stormwater regulations.⁶

For a trading program to be successful in the Charles and reduce phosphorus loadings, regulators will need to establish trading rules for implementation, verification, enforcement and reporting. We believe that MassDEP is the proper agency for implementing and administering the trading program. Realistically, we think it unlikely that EPA New England would coordinate such a program even though Massachusetts is not a delegated state for

⁴ Other benefits would also inure to Massachusetts. As explained in the District Department of the Environment Notice of Final Rulemaking: Stormwater Management, and Soil Erosion and Sediment Control, p. 5-6 for Washington, D.C.:

Socioeconomically, an increase in retention BMPs should increase the number of green jobs in the District, including low-skill and moderately skilled installation, operation, and maintenance jobs, as well as relatively high-skilled design and engineering jobs.

The increase in retention BMPs also provides aesthetic, health, and ancillary environmental benefits to the District. Finally, it is worth pointing out that DDOE sees the off-site provisions in these amendments as having the potential to result in a relatively large amount of retention BMPs being installed in less affluent parts of the District, meaning that these amendments also have the potential to improve environmental justice outcomes in the District.

⁵ To qualify as a credit, there must be a “pollutant reduction greater than those required by a regulatory requirement or established under a TMDL.” *Water Quality Trading Policy*. “For example, where a TMDL has been approved or established by EPA, the applicable point source waste load allocation or nonpoint source load allocation would establish the baselines for generating credits.” *Id.*

⁶ Since WWTPs in the Charles have recently upgraded plants to meet their phosphorus limits, there is little incentive for them to engage in trading.

NPDES permitting.⁷ Given MassDEP's already scarce resources, the program would need to be fee-based to enable MassDEP to recoup the cost of hiring staff to support the program, or possibly financed through a portion of the SRC sales price, or perhaps through an independent clearinghouse, similar to the non-profit Low Impact Hydropower Institute (LIHI), which certifies hydropower projects that have avoided or reduced their environmental impacts. A credit exchange - if MassDEP does not retain full control of the program - could also authenticate trades. CRWA's Blue Cities Exchange can fill this role, identifying cost-effective BMPs and buyers and potential sellers, facilitating trades, and providing transparency. There are a number of options for how to structure and implement a stormwater phosphorus reduction trading program that should be considered. However, the rules for trading will need to be established in the first instance by the regulators.

2. Regulatory Framework

Although Massachusetts does not have delegated authority to issue NPDES permits, it jointly issues MS4 permits with EPA and issues the CWA section 401 water quality certification for general and individual MS4 and other NPDES permits. Pursuant to 314 CMR 3.06, MassDEP has authority to issue permits, including general permits for storm water discharges from MS4s regulated under EPA's Phase 2 Storm Water Regulations.⁸ The regulations also allow for shared responsibility to implement the MS4 Minimum Control Measures.⁹ The regulations at 314 CMR

⁷ According to information on the Environmental Trading Network, see, <http://www.envtn.org/>, "EPA maintains oversight of trading programs throughout the country. This oversight ensures some level of continuity, not only nationally, but also within a specific EPA region. In particular, in Idaho, EPA maintains more oversight than in most states as they also issue NPDES permits for the State of Idaho. "Idaho recognizes pollution trading point-point source and point to nonpoint source in its Water Quality Standards at IDAPA 58.01.02.054.06. In Idaho, trades must be included in the discharger's NPDES permit.

⁸ The Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26 through 53, applies to both point and nonpoint source pollution.

⁹ 314 CMR 314 CMR 3.06(11)(b)(6) provides:

6. Ability to Share Responsibility to implement the Minimum Control Measures. An operator of a small MS4 may rely on another entity to satisfy its general permit obligation to implement a minimum control measure if:
 - a. The other entity, in fact, implements the control measure;
 - b. The particular control measure, or component thereof, is at least as stringent as the corresponding general permit requirement;
 - c. The other entity agrees to implement the control measure on behalf of the operator of the small MS4. In reports that the operator of the small MS4 is required to submit to the Department pursuant to 314 CMR 3.06(11)(b)7., the operator shall specify that it relies on another entity to satisfy some of its general permit obligations and shall identify such other entity; and
 - d. The operator of the small MS4 remains responsible for compliance with its general permit obligations if the other entity fails to implement the control measure, in whole or in part.

3.04 will likely need to be updated to reflect the requirements of the new MS4 general permit. Trading authorization and rules could fairly easily be incorporated into these regulations. They could also be incorporated into WQS (and antidegradation), TMDLs¹⁰ and NPDES permits. *Water Quality Trading Policy*.¹¹ Any trading program must be consistent with MA WQSs.

“A TMDL is often the driving force that motivates the participation of key players.” *EPA Water Quality Trading Evaluation Final Report* (Industrial Economics, Inc. 2008) at 3-4, <http://www.epa.gov/evaluate/pdf/water/epa-water-quality-trading-evaluation.pdf>.

“[T]he existence of a TMDL and the associated waste load allocations create the data foundation necessary to develop trading ratios and other parameters used to structure WQT [water quality trading] programs. *Id.*”

We recommend updating the *Massachusetts Stormwater Management Standards* and the *Stormwater Management Handbook* to better incorporate TMDLs. A standard for TMDL compliance should be added as should a discussion of trading. Since many projects will be redevelopment, MassDEP will need to clarify its use of the term “maximum extent practicable” in redevelopment projects. CRWA believes that off-site TMDL compliance is legally required when full onsite compliance is not feasible for redevelopment projects. A trading program will serve to facilitate this. In our experience in the Charles River watershed, development and redevelopment projects subject to MEPA review are, irrespective of Wetlands Protection Act jurisdiction, meeting the nutrient TMDL. The problem lies at the local level since many boards and commissions are either unaware of TMDL limits, or lack the knowledge to determine if a project is meeting phosphorus reduction requirements.

It is not known at this time whether EPA’s MS4 general permit for Massachusetts will include trading authorization either in the permit, or in the accompanying fact sheet, or whether this is even necessary,¹² so long as trading is consistent with the CWA. We note that the Washington, D.C. stormwater NPDES permit DC0000221 (Permit), reissued on October 7, 2011, modified November 9, 2012 requires an off-site mitigation and/or fee-in-lieu program to be utilized when

¹⁰ Idaho Department of Environmental Quality suggests that “[i]f trading is not authorized by the TMDL, the TMDL should be administratively updated to authorize trading for the watershed.” *Water Quality Pollutant Trading Guidance*, Idaho Department of Environmental Quality (2010) at p. 11.

¹¹ “Clear legal authority and mechanisms are necessary for trading to occur. The CWA provides authority for EPA, states and tribes to develop a variety of programs and activities to control pollution, including trading programs.” *Water Quality Trading Policy*.

¹² *Cf.*, EPA’s *Water Quality Trading Toolkit for Permit Writers*, Aug. 2007, EPA-833-R-07-004 (Trading Toolkit) at <http://water.epa.gov/type/watersheds/trading/WQTToolkit.cfm>, which provides that single point source–nonpoint source trades “would be reflected in an individual National Pollutant Discharge Elimination System (NPDES) permit for the point source either by referencing or incorporating the terms of the trade agreement.” The rationale is that “clearly-articulated trading provisions in NPDES permits.” are necessary for enforceability. *Keys to Success Poster*, http://water.epa.gov/type/watersheds/trading/upload/2008_09_12_watershed_trading_wq_keys.pdf.

projects will not meet stormwater management performance standards as defined in Section 4.1.1 of the Permit.¹³ The permittee has the option of implementing an off-site mitigation program, an fee-in-lieu program, or both. Permit, Section 4.1.3.¹⁴

While EPA's *Trading Toolkit* includes point to nonpoint trades, it does not discuss nonpoint to nonpoint trading. Nevertheless, Toolkit principles are equally applicable to nonpoint-nonpoint trades. To be successful a trading program must be: transparent (keeping public informed), real (pollutant reductions and water quality improvements), accountable (tracking mechanisms and program evaluation), defensible (based on sound science and protocol), and enforceable (responsibility for meeting or exceeding water quality standards). See, http://water.epa.gov/type/watersheds/trading/upload/2008_09_12_watershed_trading_wq_keys.pdf.

3. Implementation

The success of trading will depend in large part on the drivers, *i.e.* is the regulatory or permitting scheme strong enough to result in required phosphorus reductions and does it provide incentives for trading? An article published in the Environmental Law Institute focusing on point-nonpoint trades concludes that "institutional obstacles are significant, but of secondary importance and capable of being overcome."¹⁵ Dennis M. King and Peter J. Kuch, *Will Nutrient Credit Trading Ever Work? An Assessment of Supply and Demand Problems and Institutional Obstacles*, 33 ELR 10352 (2003). "The problems related to inadequate supply and demand are more important, more difficult to overcome, and largely outside the control of regional groups attempting to develop and manage nutrient trading systems at the watershed level." *Id.* "Demand is determined by regulatory requirements that create "credit seekers . . . and supply is

¹³ Section 4.1.1 requires that "all projects undertaking development that disturbs land greater than or equal to 5,000 square feet:

Require the design, construction and maintenance of stormwater controls to achieve on-site retention of 1.2" of stormwater from a 24-hour storm with a 72-hour antecedent dry period through evapotranspiration, infiltration and/or stormwater harvesting and use for all development greater than or equal to 5,000 square feet.

The permittee may allow a portion of the 1.2" volume to be compensated for in a program consistent with the terms and requirements of Part 4.1.3 [(Off-Site Mitigation and/or Fee-in Lieu for all Facilities)]." (emphasis added).

¹⁴ However, under the D.C. stormwater rules, absent "extraordinarily difficult site conditions," 50% of stormwater must be retained on site before offsite or in-lieu payments are allowed. §§ 520.5(c), 526.

¹⁵ Institutional obstacles are defined as "those associated with trading institutions per se, such as problems establishing acceptable rules and units of exchange, methods of assigning trade risks, or monitoring or enforcement capabilities. Obstacles created by government programs that limit the willingness of buyers or sellers to participate in nutrient credit trading are . . . referred to as supply- and demand-related obstacles." *Id.* at 10353.

determined by the terms and conditions that regulators put on what can be exchanged, e.g., the “creditworthiness” of . . . [stormwater BMPs]. In general, buyers in these markets want to minimize the price of purchasing an offset credit, and sellers want to minimize the cost of producing them. Both are only as ‘quality conscious’ as third-party trade regulators require them to be.” *Supra*, 33 ELR at 10353. This three-party dynamic requires clear rules of exchange to ensure environmental benefit and to reduce credit buyer risk. The challenge is to develop a trading program that incentivizes environmental protection through trading, but is also not so onerous that it “prevent[s] trading from taking place, even where opportunities for water quality gains and cost-savings are significant.” *Id.* at 10355.

EPA’s “Common Elements of Credible Trading Programs” are 1) legal authority and mechanisms for trading to occur; 2) clearly defined units of trade; 3) generation of credits must occur before or during same period they are used to comply; 4) quantifying credits and addressing uncertainty for estimates of nonpoint source loads and reductions; 5) compliance and enforcement provisions—*i.e.*, recordkeeping, monitoring, reporting, inspections, and audits; 6) public participation and access to information (for markets to function efficiently and for the public to be able to monitor trades); and 7) program evaluations. *Water Quality Trading Policy, supra.*

a. Units of Trade

To compensate for uncertainties in nonpoint sources and specifically for stormwater runoff, EPA recommends monitoring or modeling to estimate pollutant loads and reductions.¹⁶ Here, model-simulated structural and non-structural BMP phosphorus removal curves developed for EPA New England can be used to determine phosphorus removal estimates. *See, Stormwater Best Management Practices (BMP) Performance Analysis* (Tetra Tech for EPA 2010) at <http://www.epa.gov/region1/npdes/stormwater/assets/pdfs/BMP-Performance-Analysis-Report.pdf> (“estimates of long-term cumulative efficiencies for several types of BMPs, according to their sizing. The curves reflect pollutant removal performance of BMPs designed and maintained in accordance with Massachusetts stormwater standards”); *See also*, BMP Decision Support System (BMPDSS) (Tetra Tech 2005 a & b) and System for Urban Stormwater Treatment and Analysis Integration Model *SUSTAIN* (EPA 2013). <http://www.epa.gov/nrmrl/wswrd/wq/models/sustain/>. Blue Cities Exchange uses the EPA phosphorus removal curves and cost estimates developed by CRWA staff based on experience installing BMPs and with input and peer review by consulting engineers for various BMPs.

We recommend that a trading ratio, or margin of safety, be built into nonpoint-nonpoint

¹⁶ EPA believes this may be based on local hydrology and actual data or pollutant loading factors that relate land use patterns, percent imperviousness or percent disturbed land and controls or management practices in a watershed to per acre or per unit pollutant loads, where other methods are not specified in a permit or regulation. *Id.*

trades.¹⁷ A ratio closer to 1:1 may be appropriate for nonpoint-nonpoint stormwater trading, depending on location. Pounds of phosphorus removed tied to the nutrient TMDL, subject to a trading ratio, should be the basis of the credit.¹⁸ The nutrient TMDL establishes the upper limit of phosphorus loading under this cap-and-trade type-program.

“Robust, consistent, and standardized estimation methodologies for nonpoint source actions” are critical to the success of trading involving nonpoint sources. Selman et al., *Water Quality Trading Programs: An International Overview*, World Resources Institute (2010). Although monitoring would also confirm BMP phosphorus removal, we think this is not practicable for nonpoint trades and by raising the cost of credits, serves as a disincentive for these types of trades.

b. Location/Spatial extent

Both in valuing credits and more importantly, to ensure water quality improvements, the location of the credit should be factored into trades. BMPs upstream or in the same sub-basin should receive full credit subject to the trading ratio, while the “creditworthiness” of downstream BMPs should be discounted.¹⁹ A credit exchange could convert the location-specific credit to a standardized unit of credit for subsequent sale. The Massachusetts biological and groundwater withdrawal level (GWL) categories 1-5 developed at the HUC-14 scale through the Sustainable Water Management Initiative provide data that can be incorporated into a trading program. Trading outside the regulated buyer’s watershed should not be allowed. In MS4s, credits could be generated by BMPs that remove phosphorus from

¹⁷ Typical trading ratios for point-nonpoint trades are 3:1 or 4:1. *Supra*, 33 ELR at 10357. However, this creates an obvious price disincentive for trading. These higher ratios for point-nonpoint trades are necessary because the “uncertain value” of the nutrient discharge reductions must be greater than the “certain value” of the point source discharge. *Id.*

¹⁸ Conversion of land through removal of impervious cover and installation of structural BMPs will require that a restrictive covenant or easement run with the land and is recorded. Credits will be generated as long as land remains in converted land use/BMP effectiveness. This is discussed in more detail below.

¹⁹ In the context of point-nonpoint trading, EPA explains:

EPA supports a number of approaches to compensate for nonpoint source uncertainty. These include monitoring to verify load reductions, the use of greater than 1:1 trading ratios between nonpoint and point sources, using demonstrated performance values or conservative assumptions in estimating the effectiveness of nonpoint source management practices, using site- or trade-specific discount factors . . . Where appropriate, states and tribes may elect to establish a reserve pool of credits that would be available to compensate for unanticipated shortfalls in the quantity of credits that are actually generated.

Water Quality Trading Policy, supra.

the municipal stormwater system itself in addition to BMPs that capture and infiltrate or reuse stormwater runoff.

c. Timing and duration of credits

Credits should only be allowed or certified for BMPs installed at the time of the trade and remain valid as long as they remain functional; to maintain the credit, annual reports need to reflect proper operation and maintenance. Because BMPs have a life expectancy, after certain period of time, or at a time determined appropriate to the BMP in question, credits should be reviewed/recertified and the program should also provide for credit expiration. We believe there should be some obligation by the credit seller to affirmatively certify proper O&M annually to the credit purchaser. In the event of BMP failure or removal, the permittee would be responsible for purchasing new credits. Trading rules should allow for BMP modification; however modifications with revised as-builts will need to be reported.

Some trading programs do not allow credits to be banked.²⁰ Depending on the structure of the trading program, we think banking of SRCs should be allowed. This will encourage credit generation and water quality improvements when market conditions produce no current demand/buyer. Of course, this requires a broker or exchange that is willing to buy or bank the unused credits.

It is important that permittees purchasing SRCs credits retain their legal obligations for permit compliance. In the event of a default by the credit generator, or failure of the BMP, the buyer-permittee must be responsible for complying with phosphorus reduction requirements. The length of the credit will also have to be determined. EPA suggests credit is appropriate so long as the BMPs continue to function as designed. Under D.C.'s stormwater rules, the credit must be purchased annually. In Annual MS4 reporting, O&M reporting could be completed by the credit generator in a certification form.

d. Market Structure

There are a number of ways the trading market could be structured. As explained in the *EPA Water Quality Trading Evaluation Final Report, supra*, at p. 2-6, various types include:

Bilateral Negotiations: Under this structure, each transaction requires substantial interaction between the buyer and the seller to exchange information and negotiate the terms of trade. Buyers and sellers make agreements on their own, with a public authority participating to approve the trade and set an appropriate trading ratio.

²⁰ Idaho does not permit banking of credits and only allows trades in the same month in which the credit is generated.

Clearinghouse: In this market structure, the link between the buyer and the seller is replaced by an intermediary. The clearinghouse is authorized by the oversight agency to pay for pollutant reductions and sell credits to sources that need them.

Exchange: This market structure is characterized by its open information structure and fluid transactions between buyers and sellers. In an exchange, the price for credits is fully visible. Exchanges can develop only when a unit of pollutant control from one seller is viewed as equivalent to a unit from any other source.

Sole Source Offsets: A sole source offset takes place when an individual facility is allowed to meet a water quality standard at one point if pollutants are reduced elsewhere, either on-site or by carrying out pollution reduction activities off-site.

Third Party: In this market structure, buyers and sellers use a broker to conduct trading; the broker may be a regulatory agency, a NGO, or an independent body established for the purpose of trading. The broker facilitates bilateral trades; unlike a clearinghouse, using a third party does not eliminate contractual or regulatory links between sellers and buyers.

e. Transparency and Accountability

Whether trading is managed by MassDEP, a clearinghouse, a trading exchange, or broker, MassDEP will in some way need “to approve the validity of the trade.” *Supra*, 33 ELR at 10360. At a minimum, trades will need to be reported to MassDEP in real time. An on-line database can facilitate trades as well as provide the public with trade information. This is important for transparency. Blue Cities Exchange has the potential to allow MassDEP to monitor trades, approve them, and inform the public of trades via the on-line program/database.²¹

²¹ Although discussing point to nonpoint trades, EPA’s direction seems equally relevant to nonpoint-nonpoint credit exchanges:

Nonpoint source credit exchanges perform many of the functions that a point source and nonpoint source would otherwise have to perform (e.g., trade negotiations) as potential trading partners. In addition to negotiating the trades, the credit exchange can provide continuity by establishing standards for trading, defining credits eligible for trading, setting credit prices, verifying the operation and maintenance of BMPs, and tracking important trade information for all participants. A nonpoint source credit exchange might perform some or all of these functions, thereby influencing the roles of the trading partners accordingly. The more responsibility that rests with the exchange, the more streamlined the process of negotiating a trade agreement may be for the point source and the permitting authority. The role the exchange takes on could greatly reduce the transaction costs of trading.

f. Compliance and Enforcement

MassDEP's ability to take enforcement action must be clear. To ascertain permittee compliance, trading rules (or its acceptance of a credit via certification) should give MassDEP the right to inspect, to check maintenance records, require reporting, to conduct monitoring and to generally verify BMP implementation. A statistically significant audit of credit generating BMPs should be built into the program.

4. The D.C. Stormwater Rule and Trading

A stormwater phosphorus removal trading program will need to be tailored to Massachusetts. However, it is instructive to examine Washington, D.C.'s fledgling stormwater trading program, which provides for nonpoint-nonpoint stormwater trading.²²

The SRC [stormwater retention credit] Trading Program allows property owners to generate and sell SRCs by installing green infrastructure that has the capacity to retain stormwater and thereby reduce the runoff that harms District streams and rivers. An SRC is worth one gallon of retention for one year, and regulated development sites buy and use SRCs to meet their regulatory requirements for retaining stormwater runoff.²³

MS4 2013 Annual Report at p. 19 (emphasis added).

The regulations establish a 1.2- inch stormwater retention requirement for major regulated projects,²⁴ which can be achieved:

on site or through a combination of on-site retention and off-site retention, under the following conditions:

(a) The site shall retain on site a minimum of fifty percent (50%) of the 1.2 inch SWRV [(stormwater retention volume)], calculated for the entire site, unless the Department approves an application for relief from extraordinarily difficult site conditions [(technically infeasible or environmentally harmful)]; and

(b) The site shall use off-site retention for the portion of the SWRV that is not retained on site.

§520.4.

²² The D.C Rule on Stormwater Management and Soil Erosion and Sediment Control (Stormwater Rule), amending Chapter 5 of Title 21 of the District of Columbia Municipal Regulations was adopted in 2013 following the issuance of the District's stormwater NPDES permit.

²³ The Stormwater Rule is not pollutant specific; accordingly, trades are based on gallons retained.

²⁴ Defined as a combined footprint of improved building and land-disturbing activity of five thousand square feet or greater. A site that undergoes a "major substantial improvement activity" must achieve 0.8 inch stormwater retention with the option of 50% being met off-site. §522.5

DDOE approves all stormwater management plans (SWMP).²⁵ The approved SWMP must be filed at the Recorder of Deeds with covenants or easements, if applicable. For major regulated projects, a final preconstruction application is required; after DDOE conducts a final construction inspection, the applicant must submit as-builts. DDOE has the right to enter on to property to inspect BMPs. See generally, <http://ddoe.dc.gov/swregs>

In order to meet the performance standard for stormwater retention volume, SRCs can be used off-site. DDOE certifies the SRC for a gallon of retention capacity created by the BMP or land cover. “Only the owner of a SRC may apply to the Department for approval to use a SRC to achieve an Offv [(off- site retention volume)].” §527.6²⁶ A SRC may be banked indefinitely until used to achieve a gallon of Off-Site Retention Volume (Offv) for one (1) year,” or DDOE retires it. §532.1. One SRC must be used to achieve each gallon of off-site retention volume each year. §527.3 (a). An SRC may be bought or sold. §533.1 Transfer of SRC ownership requires DDOE approval. §533.3.

Applications for SRC certification are submitted electronically to DDOE for review and approval, and if approved, applicants are notified via the database. DDOE generates SRC serial numbers and lists them with seller contact information and an asking price in the SRC Registry. Buyers and sellers contact each other to negotiate trades. Once a trade agreement is reached, participants apply to transfer SRCs. If the SRCs are available for sale, DDOE transfers the SRCs between user accounts. The Registry reports SRC information in real time. See also, 2013 DDOE Stormwater Management Guidebook, Ch. 6 and 7. The regulations require DDOE to “publicly share information of the price, purchase, sale, value, time, certification, and use of an SRC that is not personal, proprietary, a trade secret, or otherwise confidential.” §533.7.

The Stormwater Rules also allow for shared BMPs with the approval of DDOE in satisfaction of on-site stormwater management requirements and these can also be eligible for a SRC. §525.1A. With one exception, use of an SRC is not location dependent: “[a] person may use a

²⁵ “No person shall engage in a project for the generation of a Stormwater Retention Credit unless the Department has issued an approved SWMP for the project, except as otherwise provided in this chapter.” §516.7.

²⁶ A gallon of retention capacity in a Best Management Practice (BMP) or land cover is eligible for SRC certification if it meets the following eligibility requirements:

- (a) The gallon retained by the BMP or land cover shall:
 - (1) Be in excess of the Stormwater Retention Volume (SWRV) for a major regulated project or, for a site that is not regulated, in excess of pre-project retention;
 - (2) Be no more than the SRC ceiling; and
 - (3) Not be installed to comply with a stormwater management requirement of a statute, regulation, or court order, including for . . .

- (B) Compliance with a Watershed Implementation Plan established under a Total Maximum Daily Load for the Chesapeake Bay.

§531.3

Department-certified SRC without regard to the location within the District of the best management practice or land cover that generated the SRC, except as specified for an Anacostia Waterfront Development Zone site.” §527.9.

In FY 2013, DDOE developed a database to manage SRC Trading. DDOE reported that although there were no trades in 2013, it is “developing a Request for Applications to identify a third-party nonprofit partner to stimulate SRC supply by purchasing SRCs on behalf of the District Government,” “convening a legal workgroup to develop model templates for trading contracts between SRC buyers and sellers” and developing outreach materials. 2013 DC MS4 Annual Report. On line forms have been developed for:

- Application for Certification of Stormwater Retention Credits
- Application for Transfer of Stormwater Retention Credit Ownership
- Application to Use Stormwater Retention Credits for Off-Site Retention Volume
- Notification of In-Lieu Fee Payment to Meet Off-Site Retention Volume
- Application to Retire Stormwater Retention Credits

A copy of the Application for Certification of Stormwater Retention Credits is attached hereto, “Finally, the SRC trading program requires an SRC registry to support price discovery and aid in connecting sellers with buyers and vice versa. Database functions support these and other program needs.” *Id.*

5. Local by-laws

We briefly examined existing stormwater bylaws in Bellingham, Milford and Franklin since “[l]ocal development codes and ordinances are often the best place to start when a municipality wants to increase the adoption of Green Infrastructure practices.” Water Infrastructure Capacity Building Team, *Promoting Green Infrastructure*, 9 (2012). We conclude that these bylaws will need to be updated and strengthened to comply with the new MS4 permits and to facilitate trading.

The Town of Franklin requires a stormwater management plan (SWMP) and low impact development for projects one acre or greater unless “not feasible.” SWMPs are reviewed by the Department of Public Works. The infiltration performance standard is 1-inch. O&M must be performed by the responsible party and an easement may be required. “In an effort to meet EPA Phase II Stormwater Management guidelines, the Town’s preference is for natural and vegetated stormwater management systems such as swales, constructed wetlands, and bioretention cells. These systems provide groundwater infiltration while attenuating pollutant loads and peak runoff volumes.” *Franklin Best Development Practices Guidebook*.

In Bellingham, a stormwater management permit issued by the Planning Board is required for any alteration of drainage or disturbance of one acre or more of land. “The Stormwater Management Plan must contain sufficient information for the Board to evaluate the environmental impact, effectiveness, and acceptability of the measures proposed by the

Applicant for reducing adverse impacts from stormwater” and must be designed to ensure compliance with the stormwater management permit and the regulations.²⁷ §§7.7.2, 7.8.2. Stormwater management easement(s) specified in the maintenance agreement signed by the property owner must be provided “as necessary” for facility access for inspections and maintenance, preservation of stormwater runoff conveyance, infiltration, and detention areas, and access for heavy equipment required for regular cleanout. All areas used for off-site stormwater control must grant an easement for sufficient access to the Town or the Stormwater Management System Manager, unless the Board grants a waiver. §7.8.3 (C) (D).

Milford’s 2005 stormwater bylaw is administered by the Town Engineer. It applies to all flows entering the MS4. A stormwater management permit is required for 1 acre or greater land disturbance . While projects are subject to the *Massachusetts Stormwater Management Standards*, Standard 2 on post-development not exceeding pre-development discharge rates can be waived if there is adequate capacity in the MS4. The Town can also require conditions more stringent than those required in the *Standards*. On-site infiltration is first in order of BMP preference. The bylaw requires easements for inspections, BMP maintenance, and for all areas used for off-site stormwater control.

6. Trading and Property Restrictions

Potential strategies and the legal bases to restrict the use of land in connection with implementation of stormwater phosphorus reduction trading in Massachusetts are discussed below.²⁸ When a landowner sells a tradable credit through the adoption of best management practices (BMPs) or land use commitments that reduce nutrient runoff on the seller’s land (green Infrastructure or other BMPs), that landowner’s property is encumbered, and the encumbrance needs to run with the land and burden successors in interest. The transaction will need to be recorded in the registry of deeds, both to notify future purchasers of the restrictions and to assist regulators in verifying that the BMP was installed. As discussed above, the permittee will need to report on operation and maintenance of the BMP in its annual regulatory filings under the permit, most likely through a certification that both the seller and the buyer sign. BMP installation and maintenance obligations between credit seller and buyer will be private contractual agreements.

It is necessary to ensure that the selling landowner’s implementation of the BMP remains effective for the life of the credit and that successors-in-interest are bound by the same restrictions. Accordingly, property rights against landowners and their successors-in-interest

²⁷ “The Board will consider natural features, proximity of site to water bodies and wetlands, extent of impervious surfaces proposed, size of the site, and the types of stormwater management structures proposed.”

²⁸ This section was prepared with the assistance of outside counsel.

must be enforceable.²⁹

A. Restrictive Covenants

Restrictive covenants are commonly used to encumber land in the Commonwealth. Restrictive covenants have the advantage of being fairly simple to execute and record. A standard form restrictive covenant that references a deed book and page number, and attaches a cross-hatched map to the instrument could be developed, and with little legal and administrative work it would ensure that the credit-generating property owner actually installs and maintains the desired BMP(s). Restrictive covenants are not without their limitations, however, because the legislature and courts are reluctant to allow landowners to restrict land in perpetuity out of concern that in the future, the majority of land would be so encumbered that it would create an impediment to development.³⁰

In Massachusetts, “[c]onditions or restrictions, unlimited as to time, by which the title or use of real property is affected, shall be limited to the term of thirty years after the date of the deed or other instrument . . . , except in cases of gifts or devises for public, charitable or religious purposes. This section shall not apply to conditions or restrictions . . . having the benefit of section thirty two.” G.L. c. 184, § 23 (emphasis added). Restrictive covenants, negative easements, and equitable servitudes that are purportedly perpetual expire after thirty years unless they fit into the aforementioned category of exceptions. “Landowners, however, remain free to burden or benefit their land with use restrictions enforceable for a period less than, or greater than, thirty years,” provided the instrument lists a determined number of years (e.g., 999 years).³¹ However, although a restriction can be for any determined amount of time, by statute, the restriction is not enforceable unless the party seeking to enforce the restriction

²⁹ The D.C. Stormwater Rules at § 529.3 provide:

The declaration of covenants and easement shall:

- (a) Be determined legally sufficient by the Attorney General or the Department’s designee;
- (b) Be binding on each subsequent owner;
- (c) Include an agreement to indemnify the District of Columbia, its officers, agents, and employees from and against all claims or liability that may arise out of or in connection with, either directly or indirectly, any of the owner’s actions or omissions with regard to the construction, operation, maintenance or restoration of the BMP or land cover; and
- (d) Provide for inspection of and access to the BMP or land cover at reasonable times by the Department or its authorized representative.

(emphasis added).

³⁰ It is well established in the Commonwealth that “restrictions on land are disfavored.” *Ward v. Prudential Ins. Co.*, 299 Mass. 559, 565 (1938). As the saying goes, “perpetuity is a long time.”

³¹ *Patterson v. Nichols*, 448 Mass. 658, 662 (2007); citing *The Stop & Shop Supermarket Co. v. Urstadt Biddle Properties, Inc.*, 433 Mass. 285, 288 (2001).

records a “notice of restriction” before the expiration of the first thirty years of the restriction’s existence, and every 20 years thereafter.³² G.L. c. 184, §27.

Restrictive covenants appear to be the most straight-forward way to encumber land in trading. A landowner can, with little legal expense, draft a covenant clearly stating the types of uses restricted on the land, and identifying the beneficiaries of the restrictive covenant. The instrument would also have to expressly state the duration of the restriction. The restrictive covenant can last for any amount of time, provided the amount of time is set forth in the instrument.³³ However, if the recording instrument has an expressly stated 30 year limit (or less), a party cannot file a notice of restriction to unilaterally extend the restrictive covenant beyond the duration agreed to by the parties. *Brear v. Fagan*, 447 Mass. 68, 76 (Mass. 2006).

The purpose of the notice of restriction is to extend enforceability, not to extend the term of the restrictive covenant itself. *Id.* at 77. Of course, this presents a significant administrative burden, and introduces the risk that the owner neglects to record a notice of restriction prior to the expiration of the restrictive covenant. Nonetheless, depending on the intended time horizon for burdening the land, this might be sufficient.

Restrictive covenants provide a fairly uncomplicated and effective method to ensure that a land use restriction will run with the land. However, for a buyer of credits to be able to enforce a restrictive covenant, it must be a named party in the instrument. Without this, the party would lack legal standing to enforce the restrictive covenant. G.L. c. 184 § 27 states that “no restriction shall be enforceable unless the person seeking enforcement (1) is a party to the instrument imposing the restriction and it is stated to be for his benefit or is entitled to such benefit as a successor to such party or (2) is an owner of an interest in benefited land which either adjoins the subject parcel at the time enforcement is sought or is described in the instrument imposing restriction and is stated therein to be benefitted...”³⁴

³² The notice of restriction must be filed before the expiration of each successive twenty-year period. *Stop & Shop Supermarket Co.*, 433 Mass. at 288, citing G.L. c. 184, §§ 27(b), 29 and 30.

³³ For example, the recording instrument could state that the restriction lasts for 100 years, and it would be enforceable for 100 years if one of the parties to the restrictive covenant records a notice of restriction before the thirtieth year, and before each twentieth year thereafter.

³⁴ *Brear v. Fagan* supplanted the common law rule allowing parties not expressly identified as benefited in the instrument to enforce a restriction. 447 Mass. 68 (2006). In *Brear*, the party attempting to enforce the restriction was not an abutter to the locus and was not named in the instrument and the court found that they lacked standing to enforce the restriction. *Id.* See also, *Spencer v. Slavin*, Mass. LCR LEXIS 5, 20-23 (Mass. Land Ct. 2011) (holding that plaintiff abutters to the locus did not have standing to enforce a restrictive covenant because the restriction did not name them as beneficiaries); *contra*, *Rosenfeld v. Zoning Bd. Of Appeals of Mendon*, 78 Mass. App. Ct. 677,682 (2011) (holding that “that an owner of land that adjoins the restricted land is entitled to enforce a deed restriction, whether or not the instrument imposing the restriction contains an express statement that the adjoining land is intended to benefit from the restriction”). It is important to note that courts remain divided as to whether abutters have to be named in order to enforce or challenge a restriction.

B. Affirmative Easements

Affirmative easements are not bound to the thirty year time limitations under G. L. c. 184 § 23. They have the benefit of being fairly easy to record, and do not have to be renewed after thirty years. Affirmative easements “create a non-possessory right to enter and use land in the possession of another and obligates the possessor not to interfere with the uses authorized by the easement.”³⁵ Therefore, it seems that including a specific right of entry coupled with a restriction may create affirmative easements.³⁶ This is, however, not an advisable, or preferred, strategy as even the most artfully drafted affirmative easement could be construed by a court as a negative restriction on land.

C. Legislative Alternatives: Conservation Restrictions

A conservation restriction (CR), often referred to as a conservation easement, is a tool to conserve and protect private land. In a CR, a private landowner enters into an agreement with a land trust or a government agency where the landowner agrees to permanently give up some rights to the property. The landowner retains ownership of the fee interest and either donates or sells certain easement rights to the property. Conservation restrictions differ from restrictive covenants in that the landowner grants an easement or other interest in land to the “holder” of the restriction, and the holder is required to hold and enforce the conservation restriction. Conservation restrictions can be held in perpetuity, and provide additional benefits to the landowner through tax benefits. Despite their advantages, conservation restrictions have to meet specific requirements delineated in the Internal Revenue Code (IRC) to be eligible for tax benefits. Additionally, the Commonwealth requires state approval and review for all CRs, and it has adopted the IRC criteria. To gain approval for a CR and to take advantage of both state and

³⁵ *Martin v. Simmons Props., LLC*, 467 Mass. 1, 8-9 (2014); quoting *Patterson v. Paul*, 448 Mass. 658, 663 (2007). *Patterson* is the most recent Supreme Judicial Court (SJC) case highlighting the differences between a negative easement or restrictive covenant and an affirmative easement. The easement in question in *Patterson* reads in part “no structure shall be constructed upon any portion of the area subject to the view easements. The view easement will permit the owners of 9A and 9C as shown on the Plan to trim and top trees and other vegetation within the easement area on Lot 9B...” *Patterson*, 448 Mass. at 660. Although the easement clearly begins with a restriction on the use of the land, the court held it to be an affirmative easement because the language was “distinguishable in purpose and effect” from language used in restrictive covenants. *Id.* at 664. Although the easement restricted the construction of a structure, it allowed defendants the right to enter and trim the vegetation on the plaintiff’s land and that in of itself made it an affirmative easement.

³⁶ Despite the established case law, this is not an advisable strategy, as even the most artfully drafted affirmative easement could be construed by a court as a negative restriction on land.

federal tax benefits, it would need to meet the IRC criteria.³⁷ This would, however, provide an additional incentive for landowners to install green infrastructure.³⁸

In the Commonwealth, CRs currently fall under one of four categories: conservation restrictions, an agricultural preservation restriction, a watershed preservation restriction and an affordable housing restriction. G.L. c. 184 § 31. A watershed preservation restriction is intended to “retain the land predominately in such condition to protect the water supply or potential water supply of the commonwealth.” Further, a watershed preservation restriction forbids or limits any or all “construction or placing of buildings”; excavation, dredging or removal of loam, peat, gravel, soil, rock or other mineral substances except as needed to maintain the land, and “other acts or uses detrimental to such watershed.” *Id.*³⁹

In addition to probably requiring new legislation authorizing CRs for stormwater green infrastructure, the approval process would need to be streamlined to be workable administratively. Every CR must be duly recorded, approved by the Secretary of Energy and Environmental Affairs, and where the recipient of the conservation restriction is a conservation organization, approval of the mayor, selectmen, or by town meeting is required.

Every CR must also benefit the public. It cannot simply restrict development on a parcel of land. *See Mass. Port Auth. v. Basile*, 17 LCR 185, 186 (Mass. Land Ct. 2009) (holding that a restriction on development to preserve open space and reduce density did not rise to the level of a conservation restriction). Virtually nothing has been written about the use of watershed

³⁷ To meet both the IRS and Commonwealth criteria, a conservation restriction must be (a) a qualified real property interest; (b) donated to a qualified conservation organization; (c) exclusively for conservation purposes. 26 U.S.C. § 170(h)(1). The third requirement currently creates complications for the use of CRs in a trading scheme. A conservation purpose must fit into one of the following provisions: (i) preservation of land for outdoor recreation by, or the education of, the general public, (ii) protection of relatively natural habitat or ecosystem; (iii) preservation of open space, where there is significant public benefit, and (a) preservation for the scenic enjoyment of the general public, or (b) pursuant to a clearly delineated Federal, State or local governmental conservation policy; or (iv) preservation of historically important land area or a certified historical structure. 26 U.S.C. § 170(h)(1).

The second provision—protection of a relatively natural habitat or ecosystem— appears to be the provision that could be best expanded to facilitate trading. The primary concern with this provision is that a landowner’s stormwater BMPs situated miles away from the river may not be sufficiently connected to the preservation of the Charles River as a natural habitat or ecosystem. New legislative, however, could alter the scope of conservation restrictions.

³⁸ There are three primary tax savings available to a grantor of a conservation restriction: savings to (i) income taxes, (ii) estate taxes, and (iii) property taxes. However, it is important to note that some tax benefits will decrease in value over time. Later owners of the encumbered land will not see the same immediate benefits of an income tax deduction and they may not benefit from the estate tax reduction. Jay, *Risk Management, supra*, at 58.

³⁹ A watershed preservation restriction requires approval from the commissioner of the Department of Conservation and Recreation. G. L. c. 184, § 32.

preservation restrictions in the Commonwealth. The statutory language and legislative intent is to protect “water supply” or “potential water supply” of the Commonwealth. A case could be made that the protection of the Charles River watershed (and other watersheds) protects water supply. At the very least, adoption of a specialized legislative tool that falls under the conservation restriction umbrella should be considered for future legislative efforts.⁴⁰

The process for acquiring a CR would have to be streamlined to be workable given the sheer number of green infrastructure CRs anticipated. Rightly, the current CR process is fairly onerous. There is significant oversight by the public and the government. CRs are “protected by their holders and the Attorney General, who has the power to enforce CRs. G.L. c. 184, § 23 (which limits restrictive covenants to 30 years) creates an exception for “conditions or restrictions . . . having the benefit of section thirty two,” which governs conservation restrictions and watershed preservation restrictions. Conservation restrictions are not bound by the 30-year expiration period of restrictive covenants; they can be maintained in perpetuity.⁴¹ Conservation restrictions, however, involve more parties, higher enforcement costs, and have significant tax implications. There are also financial implications of being a holder of a conservation restriction.⁴²

⁴⁰ The Commonwealth may be very well-suited for such changes to conservation restrictions. Massachusetts has been called the birthplace of conservation restrictions. Zachary Bray, *Reconciling Development and Natural Beauty: the Promise and Dilemma of Conservation Easements*, 34 Harv. Envtl. L. Rev. 119, 153-154 (2010). “Massachusetts was the first state to move toward explicit statutory authorization for widespread conservation easements.” *Id.* at 128.

The legislative solution could be tailored towards smaller scale technologies (e.g., permeable paving of parking lots rather than a blanket restriction on development), which may not fit as neatly under the rubric of a conservation restriction or watershed preservation restriction. Just as watershed preservation restrictions are a legislative creation, a smaller scale green infrastructure restriction could achieve similar goals and be added as a fifth category of CRs.

⁴¹ There is some question whether the term “perpetual” is accurate, and there are methods utilizing *cy pres* and the public trust doctrine under which a conservation restriction can be terminated.

⁴² “To be able to receive tax-deductible conservation restrictions, nonprofit organizations must show they have the resources to enforce the restrictions they place on land.” Jessica Jay, *Land Trust Risk Management of Legal Defense and Enforcement of Conservation Easements: Potential Solutions*, 6 Envtl. L. 441, 467 (2000). It may be that legislation could be styled to allow a non-profit entity created for the purpose of holding and enforcing green infrastructure CRs to hold them. Resources for enforcement typically originate from a donation to the holder of the CR, which is added to an enforcement fund the holder can invest and maintain for use in the perpetual monitoring and enforcement of the conservation restriction. Some of the proceeds from the sale of a credit could be used to fund a similar monitoring and enforcement fund.

Massachusetts case law is clear that parties not named in a conservation restriction do not have standing to sue. See *Kelley v. Cambridge Historical Com’n*, 84 Mass. App. Ct. 166, 173-174 (2013) (where a church granted a preservation restriction to the Massachusetts Historical Commission, third party plaintiffs did not have standing to enforce the preservation restriction); citing *Prime v. Zoning Bd. of Appeals of Norwell*, 42 Mass. App. Ct. 796, 803 (1997) (only the holder of an agricultural preservation restriction can enforce it). There are no exceptions to this requirement.

In sum, restrictive covenants are a useful tool to encumber land, on which BMPs, and particularly green infrastructure have been used to generate SRCs, and conservation restrictions and other legislative alternatives can also provide landowners with incentives while ensuring that BMPs are functional throughout the term of the credit. With some legislative action, which is not without precedent in the Commonwealth with respect to conservation restrictions, green infrastructure could become a powerful tool in trading, water quality improvements and flood storage.



GOVERNMENT OF THE DISTRICT OF COLUMBIA
District Department of the Environment
1200 First Street NE, Fifth Floor, Washington DC 20002



Application for Certification of Stormwater Retention Credits (SRCs)

Application Date: _____

Address of Site with eligible retention capacity:

Lot: _____ Square: _____ Ward: _____

Name of Owner of Proposed SRCs: _____

Address: _____

E-Mail: _____ Phone: _____

Name of owner of retention capacity: _____

Address: _____

E-Mail: _____ Phone: _____

Name of owner of site: _____

Address: _____

E-Mail: _____ Phone: _____

Name of agent for owner of proposed SRCs (if applicable): _____

Address: _____

E-Mail: _____ Phone: _____

DDOE tracking number for Stormwater Management Plan (SWMP): _____

Retention capacity meeting volume eligibility (from DDOE SRC calculator): _____

Has DDOE previously certified SRCs for the retention capacity? _____

If no, attach the following:

As-built SWMP, including site plan showing pre-project site conditions and retention.

Signed maintenance agreement or contract for the period for which SRCs are requested.

Completed DDOE SRC calculator spreadsheet.

If yes, attach the following:

Signed maintenance agreement or contract for the period for which SRCs are requested.

Is this application for SRCs for the maximum three-year period? _____

If no, what is the period for which SRCs are requested? _____

Applicant's Signature

A. Proposed SRC Owner: I hereby certify that I have the legal right to the SRCs proposed for certification above; that the application, including supporting documentation, is complete and correct to the best of my knowledge; that access will be provided for DDOE inspections; that the retention capacity will be maintained in accordance with the maintenance agreement or contract; and that, if the retention capacity is not maintained, I will, for the volume from the period of failed maintenance, forfeit the SRCs, purchase replacement SRCs, or pay in-lieu fee to DDOE.

Signature of SRC Owner

Date:

B. Agent: I hereby certify that I have the authority of the proposed SRC owner to make this application and that the application and plans are complete and correct to the best of my knowledge. The owner has assured me that access will be provided for DDOE inspections and that the retention capacity will be maintained in accordance with the maintenance agreement or contract. If the retention capacity is not maintained in good working order, the SRC owner has assured me that, for the volume from the period of failed maintenance, he will forfeit the SRCs, purchase replacement SRCs, or pay in-lieu fee to DDOE.

Signature of Agent

Date:

FOR DEPARTMENT USE ONLY	
Approved:	Approved in part:
Disapproved:	
Signature:	
Date:	
Total SRCs certified:	Total time period for which SRCs are certified:
SRCs certified year 1:	Serial numbers:
SRCs certified year 2:	Serial numbers:
SRCs certified year 3:	Serial numbers:
Notes:	