

# Assessing Pollution Reduction Credits

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## Summary

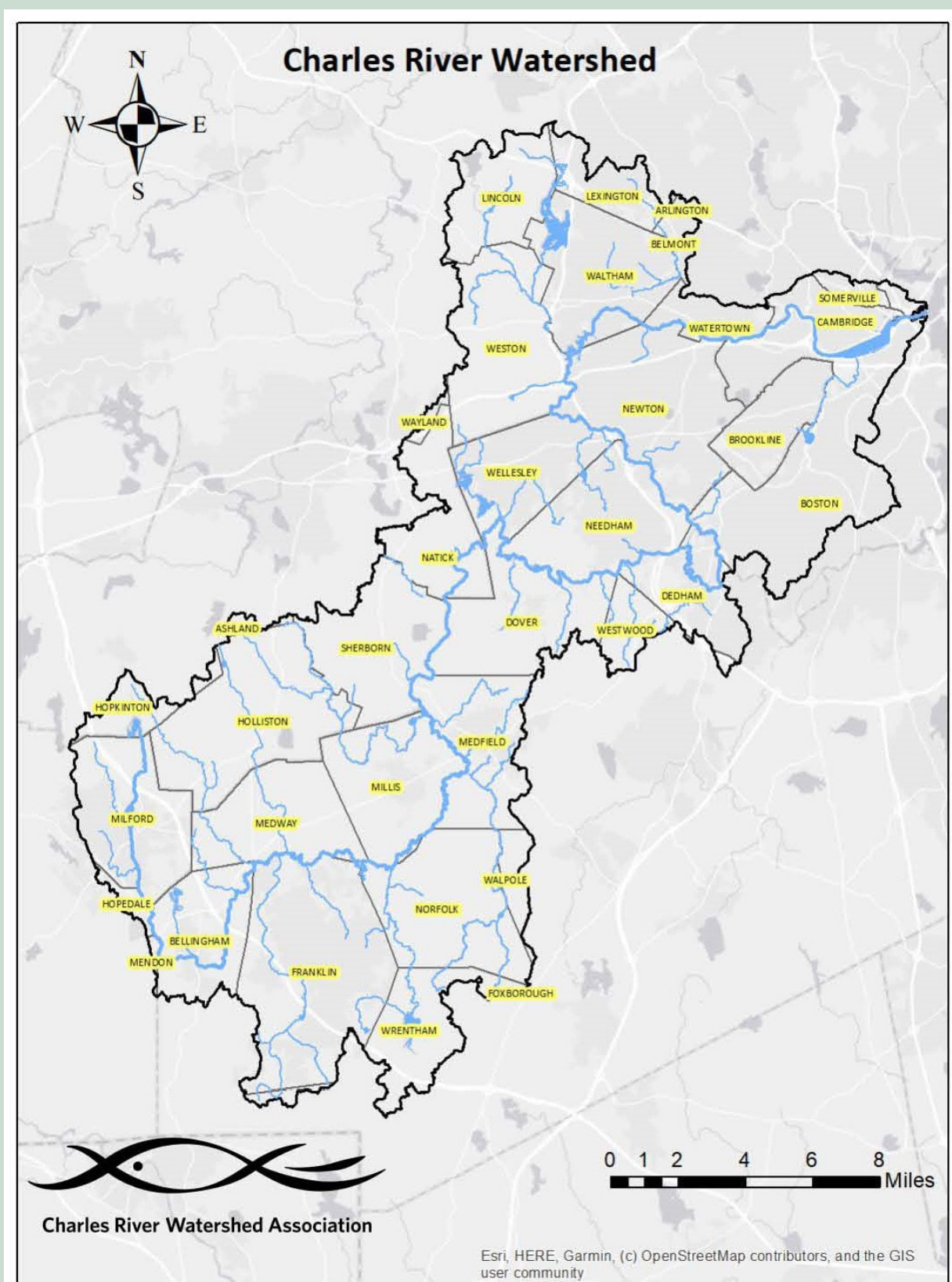
*Pursuant to the MS4 permit, communities must reduce phosphorus from stormwater runoff by a prescribed amount. This process can be challenging. In collaboration with the Charles River Watershed Association, we conducted interviews, site visits and distributed a survey to understand the challenges communities face in assessing phosphorus reduction. Our final recommendations took the form of a 6 topic information sheet, which highlighted different approaches that can help communities be successful in phosphorus reduction. Please see table of content for specific topics.*



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Assessing Pollution  
Reduction Credits



*To see the full report,  
please use the QR Code to  
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website or use link below*

<https://wp.wpi.edu/wroc/projects/projects-by-term/spring-2022-projects/pollution-credits/>



# PHOSPHOROUS CALCULATIONS 1

Most communities interviewed are in various stages of calculating their phosphorus reduction.

Communities ranked these phosphorus calculations tools from the most challenging to the least challenging,

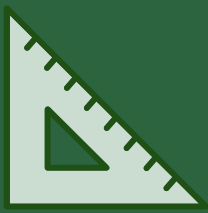
1. Plans/Drawing
2. Field Measurements
3. Assumptions
4. Software

**Challenge 1: Still in the Process of Identifying, Mapping, or Maintenance of BMPs:** Some communities are still in the process of identifying and maintaining existing structural BMPs, preventing them from credit calculations for those locations.



**Challenge 2: Disconnect Between Communities and Regulators:** Some communities question if their phosphorus reduction calculations are actually representative of what their communities' BMPs are actually reducing.

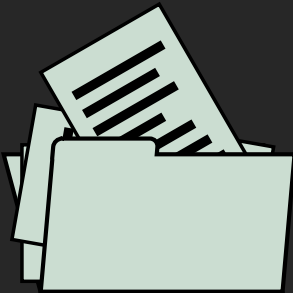
**Challenge 3: Trouble with the BATT Tool:** Some communities found the BATT tool to be confusing. Many were unsure of how to make assumptions for phosphorus calculations.



**Challenge 4: Field Measurements are Difficult for Communities for a Variety of Reasons:** Challenges include lack of staff to perform fieldwork, and access to private BMPs for maintenance and inspection.

## What has been Successful?

**Keeping Record of Maintenance:** One of the requirements to receive credit is to show annual O&M. Communities who kept track of maintenance by utilizing spreadsheets allowed them to start the credit calculations. One community uses PeopleGIS, which integrates inspection and maintenance data in GIS system



**Future Plans Requirements:** Require projects that undergo local permitting to submit phosphorus reduction calculations, pre and post new and redevelopment or at the very least, require clear and concise information for the BATT tool.



**Stormwater Utility Fee** Communities that have stormwater fees require O&M plans in order to receive a reduction credit of the fee.

**Hiring a Consultant:** Some communities utilize consultants to handle the phosphorus credit calculations, which allow for communities to focus on other aspects of stormwater management.

## Recommendations:

**Keep Record and Track of Maintenance** Develop schedules to stay organized and keep track of all O&M completed and how frequently it is done. Some communities track maintenance and inspection into their GIS system, and other communities use spreadsheets and one drive folders to keep track of maintenance.

**Utilize the BATT Tool** Although communities have some challenges, the BATT tool is approved by EPA to calculate phosphorus credit. CRWA provides training and the US EPA has guidelines regarding the BATT tools.



**Data to Collect in Field Measurements:** Drainage area, impervious vs pervious, infiltration rates, volume of BMP and verifying type of BMPs are some of the data that could be collected with fieldwork.

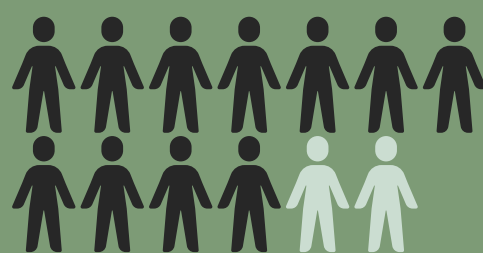


**Hire a Consultant:** Having a consultant in charge of phosphorus credit can help jumpstart the community with calculations and save valuable time.



Most communities find mapping and maintaining privately owned BMP's to be a challenge. **Establishing regulations and easements is necessary for maintaining private BMPs.**

**11 out of 13 survey respondents lack regulation for maintenance of private BMPs. 9 out of 13 lacked easements for maintenance.**



**Challenge 1: Obtaining Access/Easements:** Many communities have trouble receiving access to private BMPs for inspection and/or maintenance and the process of having an agreement can be difficult.



**Challenge 2: Communication Between Department and Community:** Communities found communication to be an obstacle when dealing with private contractors and property owners keeping up with their maintenance. Lack of staff time limits in-person communication and inspection.

**Challenges 3: Mapping Privately Owned BMPs:** This is challenge to communities due to lack of communication and proper connection between the municipality and private contractors and owners specifically with plans.



## What has been Successful?

**Stormwater Ordinance/Bylaw and Regulations:** Some communities that have, or are in the process of updating, a stormwater ordinance, require private property owners that have undergone the permit process to submit their O&M annually or more often. This be helpful in locating final BMPs, confirming maintenance, and completing the phosphorus calculations.



**Easement/Agreement to Maintenance:** Communities that have easements in privately owned BMPs found that this allows for maintenance and credit calculations. Some communities found that a selling point for some private owners was having the town maintain BMPs on their property, which overall could improve the aesthetic of the property without the owner having to do any work.

## Recommendations

**Include specific requirements in local Stormwater Ordinance/Bylaw and/or Regulations:** Require projects that undergo local permitting to submit their O&M plan and complete yearly inspections to ensure proper and timely maintenance.



**Establish Easements:** Although there are a lot of obstacles to establishing easements, such as legal restrictions and resistance, this can be crucial for communities that need to depend on private property to meet their TMDLs.



**Watch MS4 Permit sessions regarding private BMPs:** The Charles River Watershed Association held a workshop, which had lots of tips and tricks that describes calculations of privately-owned stormwater BMPs and how communities can ensure maintenance.

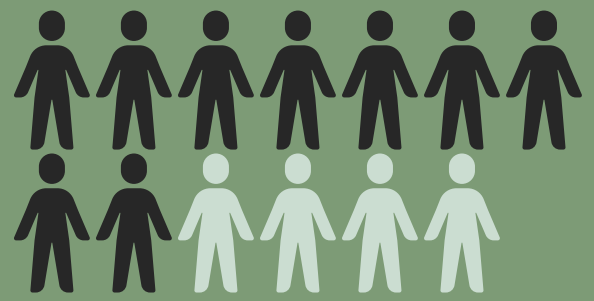


# OPERATION AND MAINTENANCE

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Operation and Maintenance of BMPs has been a challenge for every community, however the challenges varied.

10 out of the 13 survey respondents stated that staff time and funding was the biggest obstacles when maintaining public BMPs.

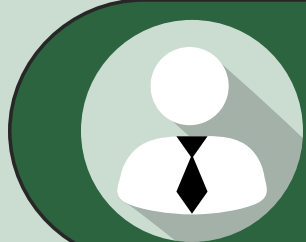


**Challenge 1: Need for More Staff and Equipment for O&M:** Most communities report needing more staff and equipment to keep up with maintenance of all BMPs in their communities.



**Challenge 2: Privately Owned BMPs/HOA:** Understanding who has the responsibility of maintaining the BMP's (HOA, easement for community maintenance, or private owner can be difficult

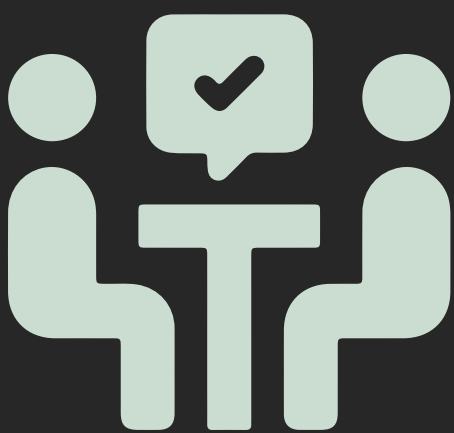
**Challenge 3: Overgrown BMPs:** BMPs that are overgrown and full of vegetation are a lot more difficult to maintain than newer BMPs, requiring more staff, time and funding.



**Challenge 4: Lack of Expertise:** Some communities report insignificant training within staff on stormwater management, which creates challenges in proper and timely O&M

## What has been Successful?

**Consultant/Contractors:** Having consultants and contractors for operation and maintenance helped communities by offloading tedious fieldwork such as catch basin cleaning, which communities utilize bidding annually for funding. This assisted towns with lesser amounts of stormwater employees, and with a relatively lower cost than hiring new personnel and equipment.



**Agreement Between Departments and Conservation Commission:** Some communities stated that understanding the importance of stormwater runoff will allow two departments to work out a plan for operations and maintenance.

## Recommendations

**Outsource to Consultant/Contractors:** Good option if the community is lacking the necessary equipment or staff to keep up with maintenance.

**Staff Training and Education:** Requiring staff training to attend training/discussion on stormwater runoff, its challenges and benefits of stormwater management could increase appreciation and teamwork on proper O&M. The CRWA and MassDEP have training/workshop sessions that can be helpful for staff to attend.



**Conduct a Cost-Benefit Analysis for Older BMPs:** BMPs that are overgrown or old may not be effective anymore. Analyzing whether maintaining the BMPs is worth the amount of phosphorus credit can save time and money. Some communities were able to determine how much it would cost to reduce a certain amount of phosphorus, which allowed them to prioritize which BMPs need maintenance.

There is a lack of public education in communities. **Increasing public involvement and awareness could help with your stormwater management.**

**7 out of 13 survey respondents found public engagement to be challenging**



**Challenge 1: Overall Lack of Stormwater Awareness and Education:** Many community members are unaware of the importance of mitigating stormwater runoff.



**Challenge 2: Resistance Towards Funding:** Many community members are resistant to having to pay a stormwater utility fee. Other communities use a small percentage of their general budget towards stormwater mitigation.

## What has been Successful?

**Involving Residents:** One community found higher engagement and enthusiasm, as residents get to choose what plants go in the rain garden on their street.



**Adding Educational Value to Public BMPs:** Some communities have built new BMPs in public areas (schools, parks, libraries), providing a great opportunity to educate the public on stormwater management.

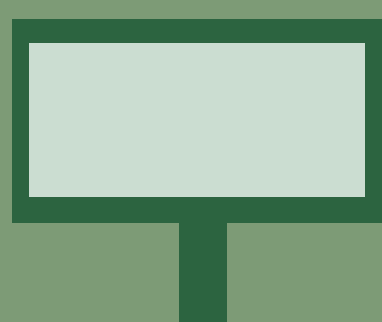


## Recommendations

**Involve community members:** Schedule community plantings and involve residents, garden clubs, and students to increase engagement and support. This could be an educational tool for students or a community service opportunity.



**Utilize Educational Signs:** BMPs in public areas is a good way to educate community members about stormwater. Put up signage to explain what BMPs are, their benefit to the community and how to keep them clean.

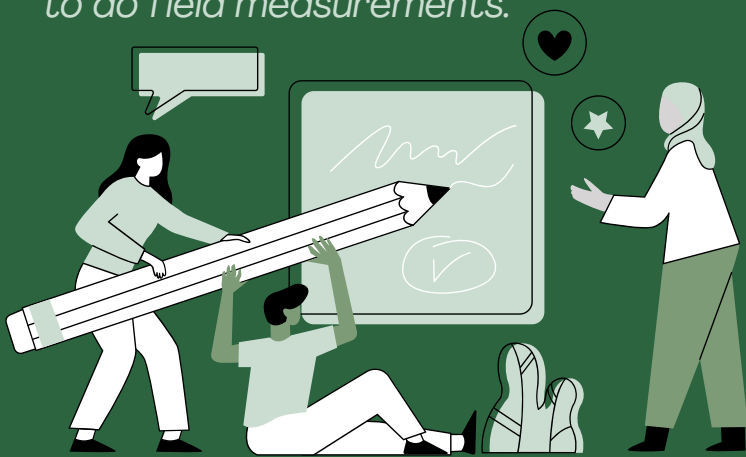




Challenges may occur when utilizing older plans/drawing to calculate phosphorus, as well as mapping BMPs.

## Challenges

- 1. Unreliable Location of BMPs:** Many plans were inaccurate (e.g., permitting-only plans did not reflect actual built BMPs).
- 2. Missing Plans:** All communities have some missing plans (especially older plans that were not digitized) or paper plans lost in files.
- 3. Dependence on Plans:** Some communities depend solely on plans, as they don't have the necessary personnel to do field measurements.



**4. Missing Necessary Information on Plans:** Communities utilizing plans to calculate phosphorus find some plans unreliable and missing necessary information to calculate the phosphorus (drainage area, impervious vs pervious, infiltration rates, volume of BMP).

**5. Underground BMPs:** Mapping underground BMPs is a challenge for many communities because they are harder to find in the field and plans are not always reliable for underground BMPs. If drawings are missing, finding the underground BMP could be very difficult.

**6. Unmapped BMPs:** Communities sometimes find BMPs that were not previously mapped in their GIS system. Some unmapped BMPs were overgrown and became unrecognizable as a BMP.

## What has been Successful?

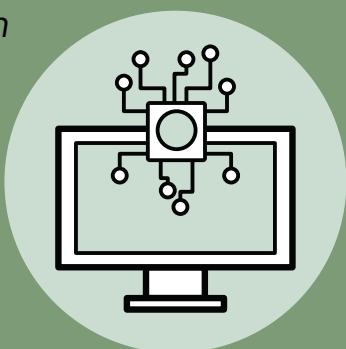
### Fieldwork/Surveying Land:

Communities that have identified all BMPs, including public and private, found that having a strong GIS system and doing fieldwork allowed them to locate all BMPs and map where they are rather than just depending on plans.

### Establishing and Maintaining Robust GIS System:

Communities with a strong GIS system with asset management software, such as PeopleGIS, allowed for future stormwater management to be more streamlined, by integrating maintenance and inspection in GIS system. Sedaru Fieldforce is a good program for on-site data collection as it has strong iPad capabilities.

**Digitize Plans:** If older plans are accurate and have necessary information for calculating phosphorus, digitalizing these plans into a GIS system, or other organization strategies, will help keep everything organized and easy to access. Some communities had successes with utilizing interns to do bulk scans and organization



**Do a Gap Analysis:** For plans that have any missing information, hiring a consultant to do gap analysis to find that information will make entering information into the BATT tool easier such as infiltration rate and soil conditions.

## Recommendations

**Require Electronic As-Built Drawings for Future BMPs:** To avoid missing information with future plans and the possibility of losing drawings, communities should require as-built electronic drawings for future implication of BMPs. This will make filing and organizing plans easier.

**Utilize Interns:** Some communities who utilized summer interns were able to get a lot of the tedious work done with mapping, scanning plans and other work that was completed within even one summer.



**For unreliable locations based on plans:** complete physical field work to find BMPs. Develop a strategy for data collection in advance. Communities recommended tracking during early spring or late fall when vegetation is at a minimum

**For BMPs identified to have missing plans, but location is known:** we would recommend that the department first assess if BMP needs maintenance. Once you've assessed if maintenance is needed, take field measurements by utilizing a survey crew or consultant that can help receive the necessary data.

**For BMPs missing necessary information, but location is known and plans are representative:** Utilize data such as state soil maps if soil conditions are unknown and collect data such as drainage area, impervious vs pervious, infiltration rates, volume of BMP, outfalls testing and type of BMPs.

Small- and large-scale communication is difficult for many communities.

Communities without the TMDLs are looking forward to what the communities in the Charles River Watershed are planning to address the TMDL and **their actions will help other communities in the future with stormwater management.**



### **Challenge 1: Communication Between Departments:**

Some communities experience a lack of communication between the local departments, specifically with maintenance.



**Challenge 2: Communication Between Town and Private Owners:** Many communities report a lack of communication between town staff and private BMP owners resulting in lack of information on maintenance, efficiency, and total reduction of pollutants from private BMPs

### **Challenge 3: Communication between communities:**

Communities generally do not widely share their challenges and successes with one another. Some communities are unaware that other communities already have solutions for shared problems.



## **What has been Successful?**

### **Stormwater Coalition:**

Communities in a stormwater coalition were able to communicate their challenges and successes. Communities without the TMDL are looking forward to what the communities in the Charles River Watershed are planning to address with their TMDLs. Their actions will help other communities in the future with stormwater management.



## **Recommendations:**

**Join a stormwater coalition:** Join and actively participate in a regional stormwater coalition. Communities in coalitions share their successes and challenges as well as learn from each other. Stormwater coalitions can also help give communities additional resources and information related to stormwater management.



**Persuade MassDEP to Provide More Communication to Communities:** We suggest communities request the MassDEP to do a quarterly newsletter to help communities receive any additional information and updates. MassDEP could provide communication resources to communities, such as registration for the email list, ways to join a stormwater coalition, and coalition meeting schedules.