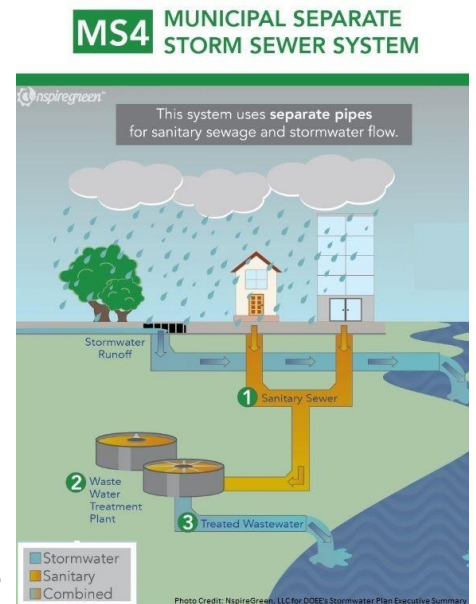


Executive Summary:

Introduction and Background

Stormwater is an important issue in many communities throughout the country. If unmanaged, stormwater can cause flooding in urban environments and can also allow a variety of pollutants to enter into local water bodies. Pollution caused by stormwater can have a number of negative impacts, so limiting water contamination is crucial. One of the ways that pollutants find their way into water systems is through MS4 drains, shorthand for Municipal Separate Storm Sewer Systems. These systems discharge stormwater runoff directly into water bodies in order to reduce flooding. Stormwater entering MS4 systems do not get treated before being discharged, meaning that MS4 runoff has the potential to carry a large volume of pollutants into local water bodies. This system is depicted in the margin (NspireGreen, 2018). Additional requirements for using MS4 drains have been mandated by the government to attempt to stop damage caused by polluted stormwater runoff, one of which being the requirement for towns to obtain permits to operate MS4s.



The Environmental Protection Agency (EPA) drafted the Massachusetts Small MS4 General permit in 2014 and finalized the permit in 2016. This permit came into effect on July 1, 2018, containing strict specifications regarding the use of MS4s. Many communities have since been unable to meet the cost demands of the new, expensive permit. Towns, who in the past were able to spend relatively little on costs associated with stormwater, now find themselves being overwhelmed with implementation costs. Many towns have been unable to meet the EPA's spending expectations and have fallen behind with the implementation schedule originally set with the 2016 permit. This has been further exacerbated because many municipal stormwater programs are a low priority within town budgets and do not receive enough funding to fully implement MS4 systems in accordance with the EPA's standards. Due to this, many towns will need to increase spending to retroactively complete past requirements and to meet future permit demands.

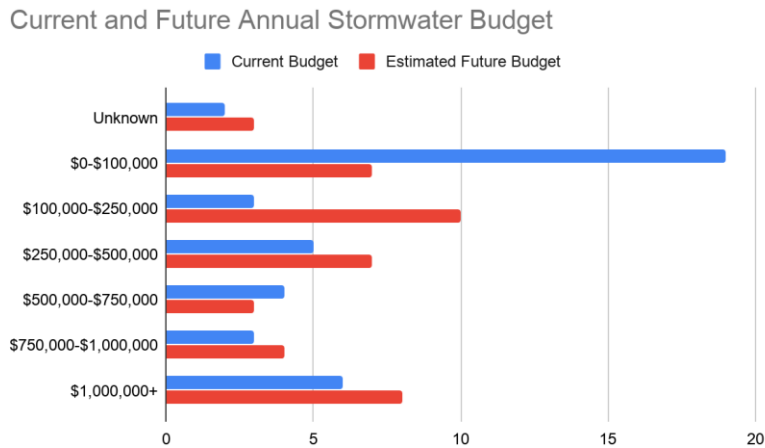
Communities have a need for updated cost estimates for MS4 permit expenses. The cost analysis supplied with the original permit by a 2014 Water Vision LLC report proved to not be realistic. Now, in 2020, communities have real data on MS4 spending, which can be compared to prior budget estimates for the same year. The goal of this project is to revise cost estimations for MS4 permit spending, which will give communities an accurate depiction of costs for stormwater management, and aid with their preparation to efficiently fulfill their implementation schedules.

Methodology

In order to create new cost estimates for the permit, we first had to understand the stormwater permit as it applied to our stakeholders. This was mainly through the use of the permit itself. Careful analysis of the permit allowed us to understand exactly what was being asked of the local communities. Naturally, there were some areas that were confusing and difficult to understand. These areas were explained to us further during several interviews with local experts on stormwater management. After understanding the permit, we analyzed the Stormwater Budget Benchmark Survey, which was provided to us by the Massachusetts Statewide Stormwater Coalition. This survey provided information on how each of the forty-two respondents were fairing up through the first year of the permits' implementation. It covered how far along they were in meeting the requirements, how much they were spending annually, what their major concerns were, as well as other relevant information for our project. This data was of critical importance to the project, and we have shown below one of the graphs we created from it. After studying the survey, we analyzed the actual implementation costs that communities have spent and compared these to the original costs estimates. In order to do this, we used the survey data and observation of three case study towns we selected: Framingham, Ashland, and Palmer. We interviewed representatives from each of these towns separately and used their town's data on stormwater spending to determine their current budget and provide a potential estimate for their likely future spending. Lastly, we created estimates for our stakeholders' future budgetary needs and provided recommendations. We were able to provide four key recommendations that should help aid towns with their current stormwater regulations concerns and provide them with more guidance on their future budget.

Findings

One of the major parts of adjusting future budgets was through the use of survey analysis. The graph below was created using survey data comparing a towns’ current stormwater budget (in blue) with their anticipated future spending (in red). The size of the bar shows the number of towns in the labeled cost bracket. The data clearly shows that towns expect to see future increases in permit spending. Currently, many towns have a stormwater budget of less than \$100,000, which is inadequate for nearly all towns. Future budget expectations reflect the demand towns see for increased stormwater spending.



One reason that towns expected a future cost increase is because new requirements of the permit go into effect each year, increasing the overall permit costs for towns. Below are our overall expected changes in current stormwater budget predictions for rural, suburban, and urban towns.

Rural Towns Projected Budget Change

Fiscal Year	FY19	FY20	FY21
Percent Change	78%	273%	261%

Suburban Towns Projected Budget Change

Fiscal Year	FY20	FY21	FY22
Percent Change	64%	3%	9%

Urban Towns Projected Budget Change

Fiscal Year	FY21	FY22	FY23	FY24
Percent Change	12%	-10%	13%	-2%

Our charts show the expected changes in current budgets for rural, suburban, and urban towns based on the U.S. Census designation. Rural towns are expected to see their budgets increase at the highest rate, which is likely due to the fact that many have been underspending and have failed to meet many of the scheduled implementation goals. Communities that have been underspending will need to significantly increase their budget in order to retroactively meet the EPA’s deadlines.

Suburban and urban communities are expected to see an initial increase in budget before tapering off. Urban towns had the least predictable trend concerning MS4 spending, as there were wide differences between urban towns’ budgets. Most urban and suburban towns had more established stormwater spending habits, which is why we expect to see slower increase than rural towns. These categories of towns needed fewer changes to their budgets, but changes were still needed nevertheless.

Costs analysis of all three types of towns were done, with the most detailed analysis coming from suburban towns. This is because our suburban town of study, Ashland, provided the most robust data of the three towns we analyzed. We incorporated town case study data with the overall survey data to produce budget changes for future MS4 permit spending.

Recommendations and Conclusions

After completing our research and cost analysis, we determined four main recommendations for the future.

Our first recommendation is that towns should plan to see budget increases. This is true for rural, suburban, and urban towns. Although this will take place at different rates for the communities, all three types should expect to see an increase, with the most rapid increase in rural town budgets, and the slowest increase in urban town budgets. The predicted cost increases are the result of some towns being behind schedule, forcing them to try to catch up over the next few years. Budgets will also likely increase due to new permit requirements coming into effect in the near future. Some of the main areas where towns should prepare for these increases include Municipal Good Housekeeping, IDDE, and TMDLs.

Our second recommendation is that towns should prepare for changes within their stormwater management programs. Towns should prepare to spend more on staffing dedicated to stormwater. Survey data has shown us that towns have much fewer staff than the EPA estimated would be necessary, and towns themselves have stated that they will likely need more personnel to properly comply with MS4

regulations in the future. Additionally, they may need to spend more in order to retroactively complete some of the permit requirements that have been missed. This includes disposal of street sweeping material and mapping of the MS4 system, which many towns have not yet completed. These are areas that will soon need to change, so towns should be prepared to make the necessary alterations within their stormwater management structure.

Our third recommendation is that towns should consider implementing a stormwater enterprise. This can be useful to them for several reasons. First, the enterprise guarantees the availability of funding dedicated to stormwater management. This solves the issue of stormwater programs being dependent on grants and town approval to enact MS4 regulations. There will be less of a focus on appealing to town appropriations committees attempting to get stormwater budgets approved. Stormwater enterprise funds have many different methods of charging fees to town citizens, so each community can tailor their billing strategy to best fit their town situation.

Our fourth recommendation is that towns should join a stormwater coalition if they have yet to do so. Coalitions prove to be helpful in many key ways. For example, they provide necessary resources and informative workshops on aspects of the permit. They host workshops to help member communities create proper technical documents, help coordinate public outreach events, and provide towns with expertise on MS4 regulation. Coalitions help towns better understand how to follow permit regulations and develop collaborative efforts between towns, which allow them to see which stormwater management practices work well, and which ones do not. Lastly, coalitions use collective bargaining to reach audiences with governmental and regulatory organizations. This allows a town to have more impactful inputs on stormwater regulation practices within the state.