ENVIRONMENTAL LAW
MYSTIC RIVER WATERSHED ASSOCIATION PROJECT
PROJECT # 1, CSOs AND THE VARIANCE

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Our team studied issues surrounding combined sewer overflows in the Mystic River watershed. One goal of the Mystic River Watershed Association (MyRWA) is to achieve a level of water quality in the Mystic River watershed that will allow the waters to be classified as "fishable and swimmable" by 2010. However, water quality is severely compromised by combined sewer overflows (CSOs).

Control of CSOs has been described as "sticky" and "complicated" by nearly everyone our team talked to, from local residents to state and federal regulators. The complications mainly come from balancing the costs and benefits of eliminating CSOs. The only way to eliminate CSO discharges is to separate the combined sewers so that all sanitary discharges go to the wastewater treatment plant and only stormwater discharges are released through the pipe. Unfortunately, sewer separation is very costly. The laws and regulations allow cost and affordability to be considered in determining the best approach to achieving water quality standards. Massachusetts regulators have built "flexibility" into the regulations, allowing CSO permit holders to not eliminate CSOs if it can be proven that doing so would cause "widespread social and economic harm." The vagueness of these terms is one reason that this issue is "sticky" and "complicated."

This memo describes CSOs and explains why they are a problem; reviews federal and state laws and regulations relevant to CSO control; and reviews the history of CSO control in the Mystic River watershed. It concludes with our team's recommendations on actions MyRWA can consider to meet its goals related to CSO control and water quality. This memo is organized as follows:

1. Combined Sewer Overflows: What They Are and Why They Are a Problem

2. MyRWA's Goals Related to CSOs in the Mystic River Watershed

3. Relevant Laws and Regulations

4. History of CSO Control in the Mystic River Watershed

5. Current Status of CSO Cleanup in the Mystic River Watershed

6 Key Issues and the Final Decision Process

7. Recommendations

1. COMBINED SEWER OVERFLOWS: WHAT THEY ARE AND WHY THEY ARE A PROBLEM

A combined sewer is an antiquated type of sewer that is designed to carry both sanitary sewage and stormwater runoff. Under usual conditions, when the sewer is able to contain all of the sewage and runoff, it is all taken to a wastewater treatment plant (WWTP) and safely discharged after receiving treatment. When rainfall and/or melting snow is heavy enough to exceed the carrying capacity of the sewer system, both the precipitation and the sewage are discharged to a receiving body of water rather than to the WWTP.

The term CSO stands for combined sewer overflow and refers to both the combined sewer overflow structure and the discharge from the structure. CSOs are meant to be used in emergency situations, and they are helpful in preventing sewage from backing up into homes and onto the street. However, increased amounts of sewage in water bodies may cause severe contamination, and preventive measures must be taken as the growing population imposes additional strains on the system.

1.1 Why are CSOs a problem?

From a recreational perspective, sewage makes swimming and fishing in the Mystic Watershed dangerous as well as unpleasant. Sewage overflow results in wastewater floatables such as condoms, toilet paper, and tampons floating in the waterways.

Obvious harms result from sewage pollution in waterways. Untreated human sewage is associated with bacteria, viruses, and excess nutrients. Nutrients, such as nitrogen and phosphorus, nourish algae, making their populations skyrocket and creating algal blooms in the receiving water. After the mass amount of algae die, an enormous amount of dissolved oxygen (DO) is used in their decay. Decomposing organisms consume much of the existing oxygen as well breaking down the sewage. This oxygen is therefore not available to fish and other animals, which may die if they do not have a certain amount of DO. This process of nutrient richness is called eutrophication, and it causes the water to have a pea-soup green color and bad odor in addition to killing off the wildlife. The limit for dissolved oxygen concentrations for most cold-water fish is 6 mg/L. The Alewife/Mystic River Advocates reported that DO fell below 5.0 mg/L in 9 of the 49 samples collected. The Massachusetts Water Resources Authority, USGS, and MyWRA measured DO levels as low as 2 mg/L.

Through extensive sampling, the Mystic Monitoring Network[i] observed the results shown in **Table 1**. Untreated sewage accounts for many sites exceeding maximum standards for fecal coliform, total suspended solids, nutrients, and DO, as reflected in Table 1. All of these are important indicators that sewage contamination is particularly bad in a certain area.

Fecal coliform is a fetid bacteria that is found in excrement and can also be used as an indicator of the incidence of disease-causing organisms. Coliform violates criteria by the highest percentage in the Somerville/Arlington location; Somerville is the only town on the table that is known to own CSOs, and Arlington is suspected to have them. This is no coincidence. The large loading of bacteria is especially bad in wide areas where the water slows down. As the particulate matter settles, the sediments are contaminated with fecal bacteria that can stay suspended for weeks up to months.

Total suspended solids (TSS) make water dirty and cloudy with a combination of silts and organic waste particles that are smaller than grains of sand. TSS amounts are reduced by over 85% when sewage water is treated.

Table 1. Percent of All Samples Deviating from Established Criteria by Site

Site	Site Description	Town	Fecal Coliform	TSS	Nitrate	Total Phos.	DO mg/L	DO %
ABR049	Aberjona @ Salem St.	Woburn	55	0	83	11	26	47
ABR028	Aberjona @ Washington St.	Winchester	45	0	100	0	0	5
ABR006	Aberjona @ USGS station	Winchester	40	0	100	58	0	21
UPL001	Upper Mystic Lake @ Mystic Lakes Dam	Medford	0	0	0	47	0	0
MIB001	Mill Brook @ Mt. Pleasant Cemetery	Arlington	75	10	50	84	0	10
MYR071	Mystic River @High St. Bridge	Arlington	10	0	0	0	0	0
WIB001	Winn Brook, outlet to Little Pond	Belmont	65	0	33	88	0	0
ALB006	Alewife Brook @ Broadway	Arlington/ Somerville	85	10	0	63	25	47
MEB001	Meetinghouse Brook, outlet into Mystic River	Medford	45	10	100	11	0	0
MAR036	Malden River @ Medford St.	Malden	42	5	0	24	0	21

The main obstacle to dealing with CSOs is that they are very expensive to fix and there is little state or federal funding. In addition, agencies that have some authority are not uniformly responsive to public concerns about environmental quality. In general, the MWRA is responsible for regional sewer system and long-term CSO control planning. The cities are accountable for taking care of illegal sewage discharges in their municipalities.

Finally, there is very little exact data on the amount of bacteria from CSO and storm drain discharges, and every entity has its own opinion on how much there is and where it is coming from. Some residents feel that there is much more sewage coming from both CSOs and drainpipes than the MWRA acknowledges, and that even more CSOs are active than speculated. There is even controversy about the distinction between which outlets are CSOs and which are drainpipes.

1.2 Where Are CSOs Located?

The MWRA sampling stations and CSOs located in the Mystic Watershed are shown on the map in **Figure 1** (at the end of this document)**.**[ii]

1.3 Who is responsible for the CSOs?

The CSOs shown on Figure 1 are operated by several authorities:

- ·The Massachusetts Water Resources Authority (MWRA)
- ·City of Cambridge
- ·City of Somerville
- ·City of Chelsea

Other communities affected include Arlington, Belmont, Everett, and East Boston. Alewife Brook seems to have the most problems, and it receives waste in water dumped from Cambridge, Somerville, Arlington, and Belmont. Various people we talked to speculate that the last two have illegal sewage connections and possibly even CSOs that are classified as storm drains. Cambridge has done the most to eliminate CSOs, and actually has plans to build a detention basin. This will slow down water from the areas that will have their CSOs separated,. mainly to prevent flooding.

The municipalities are ultimately responsible for sewage contamination from CSOs and storm drains. However, they do receive support from the MWRA, which receives fees from 44 communities.

Table 2[iii] illustrates the various actions that are required to be taken and who is responsible.

A. Actions to Minimize CSO/Sanitary Discharges	**Responsible Party**
Implement Nine Minimum Controls	
Provide estimates of AB/UMR CSO activation's and volumes over the Variance period	MWRA, Cambridge, Somerville
Reevaluate possibility of additional infiltration/inflow controls at key locations	MWRA, Cambridge, Somerville
Identify opportunities for additional SOP measures in	MWRA
local combined systems and assess likely water quality benefits	Cambridge, Somerville (MWRA)
(For AB/UMR sewer member communities) Provide MWRA BMP plan, GIS sewer system mapping, technical assistance as requested, and review community stormwater management plan to identify opportunities for enhanced pollution prevention, if requested.	MWRA
B. Actions to Further Assess CSO/Stormwater Pollutant Loads	
Receiving water sampling for AB/UMR over the Variance period to assess impacts of CSO discharges; submit report annually with results	MWRA
Stormwater sampling at representative stormdrain locations to allow for determinations of stormwater loadings	MWRA, Cambridge, Somerville
C. Assessment of CSO Controls in the Alewife/Upper Mystic Basin	
Prepare and file final report summarizing and assessing information gathered during Variance process	MWRA
Identify “triggers” appropriate for basis to determine when additional CSO controls would yield greater benefits for respective costs	MWRA (with EPA and DEP)

The MWRA is responsible for most actions, while the cities and towns are responsible for more local undertakings, such as implementation and sampling.

2. MYRWA'S GOALS RELATED TO CSOS IN THE MYSTIC RIVER WATERSHED

The goal of the Mystic River Watershed Collaborative is to achieve and maintain a "Class B" level of water quality in the Mystic River and its tributaries by 2010. Class B status will allow the waters to be considered "fishable and swimmable." Water quality classifications are described below under state regulations.

To attain Class B status, all CSO discharges must be eliminated. According to Grace Perez, MyRWA's specific goal is to gain a commitment from the Massachusetts DEP and the Massachusetts Water Resources Authority to eliminate CSO discharges into the Mystic River watershed. Without eliminating CSO discharges, the waters – because they could contain raw sewage, even if only 5% of the time – will never achieve "fishable, swimmable" status.

MyRWA recognizes that eliminating CSOs is expensive, and therefore, that the time horizon for achieving this goal may be long. What MyRWA wants, in the short term, is a firm, public commitment from MWRA to eliminating all CSO discharges. Furthermore, MyRWA believes that DEP support, in the form of an appropriate water quality classification for the Mystic River, is critical to obtaining this commitment. MyRWA believes that if the state downgrades the water quality classification to "Class B_{CSO}," then MWRA will no longer have an incentive to remove CSOs.

3. RELEVANT LAWS AND REGULATIONS

This section provides an overview of the relevant federal and state laws and regulations.

3.1 Federal Laws and Regulations

The key **federal law** that covers combined sewer overflows is the Clean Water Act (33 USC §§1251 – 1387). The objective of the CWA is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[iv] The goals of the CWA include the following:

1) Eliminate the discharge of pollutants into the navigable waters by 1985
2) Achieve an interim water quality goal that "provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in an on the water" by July 1, 1983
7) Develop and implement programs for the control of nonpoint sources of pollution

Key sections of the CWA that are relevant to CSOs include the following:

- §1251 Congressional declaration of goals and policy
- §1274 Wet-weather watershed pilot projects – authorizes technical assistance and grants to carry out pilot projects related t wet-weather discharge control
- **§1301** Sewer overflow control grants
- §1342 National Pollutant Discharge Elimination System – authorizes EPA and the states to issue permits for pollutant discharges
    - **§1342(q)** Combined sewer overflows (enacted December 2000) – permits for CSO discharges shall conform to EPA's CSO Control Policy of April 11, 1994

- §1311 – Effluent limitations – requires application of the best available technology economically achievable
  - (e) – applies effluent limitations to all point source discharges
  - (m) – modification of effluent limitation requirements for point sources
- §1312 Water quality-related effluent limitations – allows establishment of effluent limitations based on water quality
- §1313 Water quality standards and implementation plans – part (c) requires states to hold public hearings to review water quality standards every three years
- §1314 Information and guidelines – authorizes EPA to establish water quality criteria and regulations on effluent limitations
- §1329 Nonpoint source management programs
- §1316 National standards of performance
- §1342(p) Municipal and industrial stormwater discharges
- §1365 Citizen suits

The act regulates all point-source discharges of pollutants, that is, pollutants discharged from pipes. Point-source discharges are regulated through the National Pollutant Discharge Elimination System (NPDES). The act gives authority to the states to implement the NPDES permit program and to set water quality standards.

The act also encourages public participation in the development, revision, and enforcement of the regulations (§1251(e)). Finally, the act allows citizen suits.

The 2000 amendments to the Clean Water Act added Section 402(q), Combined Sewer Overflows.[v] Combined sewer overflows are defined as point-source discharges and are thus covered under the Clean Water Act: "As point sources, CSOs are subject to the technology- and water quality-based requirements of the CWA. They are not, however, subject to the secondary treatment standards that apply to POTWs."[vi]

Federal **regulations** related to the CWA are promulgated by the U.S. Environmental Protection Agency in the Code of Federal Regulations, Title 40, Protection of Environment. Chapter I, Parts 100 – 149 contains regulations related to water programs. Some key parts relevant to CSOs include the following:

- NPDES permit program (40 CFR Part 122)
- State program requirements (40 CFR Part 123)
- Criteria and standards for the NPDES permit program (40 CFR Part 125)
- Water quality planning and management (40 CFR Part 130)
- Water quality standards and designation of uses (40 CFR Part 131)
- Prior notice of citizen suits (40 CFR Part 135)

The USEPA issued its *Combined Sewer Overflow Control Policy* in April 1994.[vii] The policy establishes four principles to address concerns about cost and flexibility:[viii]

"1) providing clear levels of control…to meet appropriate health and environmental objectives;

2) providing sufficient flexibility to municipalities, especially financially disadvantaged communities, to consider the site-specific nature of CSOs and to determine the most cost-effective means of reducing pollutants and meeting CWA objectives and requirements;

3) allowing a phased approach to implementation of CSO controls considering a community's financial capability; and

4) review and revision, as appropriate, of water quality standards and their implementation procedures when developing CSO control plans to reflect the site-specific wet weather impacts of CSOs."

The policy requires CSO permit holders to:

- characterize their sewer systems
- implement nine minimum CSO controls
- develop a long-term CSO control plan

The nine minimum controls are presented in section II.B of the policy:

1. Proper operation ad regular maintenance programs for the sewer system and the CSOs;
2. Maximum use of the collection system for storage;
3. Review and modification of pretreatment requirements to assure CSO impacts are minimized;
4. Maximization of flow to the POTW for treatment;
5. Prohibition of CSOs during dry weather;
6. Control of solid and floatable materials in CSOs;
7. Pollution prevention;
8. Public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts; and
9. Monitoring to effectively characterize CSO impacts and the efficacy of CSO controls.

In Massachusetts, the state sets water quality standards based on the CWA. These standards include uses of water bodies, such as uses for drinking water, primary contact recreation (swimming), boating, and fishing, among others. Guidelines to the states in designating uses are set forth in 40 CFR §131.10. These regulations give states the authority to establish subcategories of uses if the state can demonstrate that it is not feasible to attain the designated use.

However, the EPA policy states that, before a state can remove a designated use, it must conduct a **use attainability analysis**. This analysis determines whether a designated use can be achieved if CSO controls are implemented:

> Furthermore, a State may not remove a designated use that will be attained by implementing the technology-based effluent limits required under Sections 301 (b) and 306 of the CWA and by implementing cost-effective and reasonable best management practices for nonpoint source controls. Thus, if a State has a reasonable basis to determine that the current designated use could be attained after implementation of the technology-based controls of the CWA, then the use could not be removed.[ix]

The significance of the use attainability analysis is discussed further below under state regulations.

Our team calls MyRWA's attention to the following aspects of the national CSO control policy, since they may provide some options for further actions:

- Dry-weather discharges from CSOs are absolutely prohibited.[x]
- The policy allows a phased approach to implementing CSO controls.
- Sensitive areas: the long-term CSO control plan must provide controls for overflows to sensitive areas, which include waters with threatened or endangered species and their habitats.

3.2 State Laws and Regulations

The Massachusetts Department of Environmental Protection is the state agency responsible for implementing and enforcing the Clean Water Act. Relevant state laws, regulations, and policies are:

- Massachusetts Clean Waters Act (MGL c. 21, §§26 – 53)
- Massachusetts Environmental Policy Act (MGL c. 30)
- 314 CMR 3.00 – surface water discharge permits
- 314 CMR 4.00 – Massachusetts surface water quality standards
- 310 CMR 41 – funding mechanisms
- Massachusetts Combined Sewer Overflow Policy. [xi]

The Massachusetts CSO policy has not been put into regulations (and was not intended to be).[xii] The Massachusetts policy reiterates EPA policy on implementing the nine minimum controls. All NPDES permit holders for CSOs must implement the nine minimum controls. However, complete elimination of CSOs is not necessarily required.

DEP currently provides the following classification options for water bodies:

Class A	designated uses of the water body include sources of public water supply; no CSO discharges are allowed
Class SA	similar for marine waters
Class B	uses of the water body include habitat for fish, other aquatic life, and wildlife; primary and secondary contact recreation; and public water supply in some cases; suitable for irrigation; no CSO discharges are allowed
Class SB	similar for marine waters
Class B_{cso}	CSO controls allow the water body to meet Class B use standards at least 95% of the time
Class SB_{cso}	similar for marine waters
Class C	uses of the water body include habitat for fish, other aquatic life, and wildlife; and secondary contact recreation
Class SC	similar for marine waters

A variance option is also allowed for a specified period of time if insufficient information is available to determine whether or not the use standards can bee attained. A variance does not permanently change the water body's designated uses. "A variance allows CSO discharges to be in compliance with 'modified' water quality standards in the NPDES permit while additional analyses are conducted and progress in made toward meeting the existing standard." [xiii] The regulations (314 CMR 4.03(4)) allow the state to grant a variance if the applicant demonstrates one of six things. These include:

> (c) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place

(f) Controls more stringent than those required by sections 310(b) and 306 of the Act would result in substantial and widespread economic and social impact.

Waters with CSOs in the Mystic River watershed (Alewife Brook, Upper Mystic River, Mystic/Chelsea confluence) are Class B waters, but currently fall in the variance category. However, the proposed water quality standard for these waters, as presented in the MWRA CSO Facilities Plan,[xiv] is B_{cso} or SB_{cso}.[xv]

4. HISTORY OF CSO CONTROL IN THE MYSTIC RIVER WATERSHED

The Massachusetts Water Resources Authority provides water and sewer service to Boston and many surrounding communities. Somerville, Boston, Cambridge, and Chelsea have combined sewer systems connecting to MWRA's sewer system. There are 84 CSO outlet pipes among them, but only 21 currently overflow. Combined rainwater and sewage overflow into Boston Harbor and the Charles, Mystic, and Neponset Rivers when the CSO structures cannot contain it.

The CSO Control Plan was created in 1994 as part of the Federal Court mandate related to the multibillion dollar Boston Harbor project. The MWRA was required to create a plan to reduce and potentially eliminate CSOs. The problem was that they really had no idea how much work this would require in the Mystic Watershed. Before the Clean Water Act, all storm drains were CSOs. Then, after the act was passed in 1970, many CSOs were simply reclassified as storm drains.[xvi] In reality, not much testing was done to check on the status, and it is rare to find a clean storm drain (according to activist and Mystic kayaker, Roger Frymire). Therefore, as more research was done, the MWRA has had to continuously revise its plans as more and more problems were identified. For example, MWRA thought that Arlington and Belmont had separated sewers, when in fact they did not. In addition, MWRA found several illegal connections, where homes were discharging sewage directly into the waterways. In these cases, the cities pay to have the plumbing connected to sewage pipes.

The progression of the CSO problem in the Mystic watershed has been a long, complicated process that started with a $12.1 million solution and is now projected to be in the $200 million range. The 1997 Final CSO Facilities Plan required that the MWRA periodically re-examine, optimize, and expand its CSO Control Plan if new information is discovered during the project design process.

The conditions of the variance call for the MWRA to proceed with CSO projects that are practical and cost effective, and also gather further data on CSO and stormwater loads in the watershed. Because the plan had become more expensive and intricate, in March 1999, a CSO Variance was issued by the Massachusetts DEP for the CSO discharges to the Alewife Brook/Upper Mystic River watershed.

Table 3 shows how dramatic the changes were for the newer plan. Both plans would achieve an 84% reduction in annual CSO volume.

	Frequency of Overflows	Annual CSO Volume (million gal)
Original Plan		
Assumed Existing	16	18.3
Recommended	4	2.9
Revised Plan		
Assumed Existing	63	49.7
Recommended	7	7.4

Table 4 illustrates the main differences between the two plans.

1997 Recommended Plan	Revised Recommended Plan
Separate sewers in the CAMO04 tributary area to reduce CSO discharges	Separate sewers in the CAMO04 tributary area to eliminate CSO discharges (includes construction of a new stormwater outfall and wetland detention basin)
Separate sewers in the CAMO02 tributary area to eliminate CSO discharges.	Increase size of local sewer connection at CAMO02, CAM401B and SOM01A, to reduce CSO discharges at these locations
	Increase size and capacity of Rindge Avenue siphon to reduce CSO discharges at MWRO03; add hydraulic relief gate
Floatables control at remaining CSO outfalls (SOM01A, CAM001, CAM004, CAM400 CAM401)	Separate sewers in the CAM400 tributary area Floatables Control at remaining CSO outfalls (SOMA001A, CAM001, CAM002, CAM004(2), CAM400, CAM401A, CAM401B and MWR003)
Estimated Total Cost: $12.1 M	**Estimated Total Cost: $74.0 M**

A significant addition is the separation of CAM 004, which will require a new stormwater outfall to convey the water to a new wetlands detention basin. The type of pipe installation needed for this work is much more complicated and expensive. The reevaluation concluded that "targeted" separation is much more cost effective and will yield the most water quality benefits.

Table 5 gives an idea about how severe the overflow from each CSO is. Although the volumes are known, the exact concentration of contaminants has not yet been studied. However, it is obvious that CAM 400 is the worst, and that its elimination is most urgent.

Table 5. CSO Volumes

Outfall	Existing conditions prior to Contract 2A/2B Construction		Sewer Separation Alternative A	
CAM001	Annual Frequency	Annual Volume (MG)	Annual Frequency	Annual Volume (MG)
CAM002	1	0.01	5	0.2
MWR003	7	1.57	4	0.72
CAM004	1	0.06	5	1.03
CAM400	63	24.1	0	0
CAM401A	10	0.8	5	0.27
CAM401B	7	2.74	5	1.65
SOM01A	25	10.5	7	2.24
Totals	**20**	**9.89**	**3**	**1.29**

Table 6 compares the changes in the plans for each CSO.

Outfall	Original Recommended Plan	Revised Recommended Plan
CAMOO1	Provide floatables control	Provide floatables control
CAMOO2	Eliminate CSO outfall by complete separation upstream of regulator	Increase capacity of local connection to interceptor, and provide floatables control
MWROO3	Provide floatables control	Provide hydraulic relief gate at regulator
CAMOO4	Reduce activation frequency by separating area upstream of regulator	Provide floatables control
CAM400	Provide floatables control at regulator (to remain open).	Separate area upstream of regulator, and permanently close regulator upon completion of separation work
CAM401A	Convert existing combined sewers to storm drains, to minimize need for additional new pipe	Provide major new storm drain conduits to improve drainage capacity; provide flushing chambers and grit pits to control deposition in shallowly-sloped pipes
CAM401B	Provide floatables control	Provide new stormwater outfall to Little River, with downstream detention basin to attenuate peak flows
CAM401A	Provide floatables control	Separate combined manholes upstream of regulator, and provide floatables control
CAM401B	Not addressed in original plan; outfall discovered during early field investigations	Relieve siphon downstream of Rindge Avenue combined sewer, and provide floatables control
SOMOIA	Provide floatables control	Increase capacity of local connection to interceptor, and provide floatables control

Other main discoveries that led to an increase in cost, besides the complicated piping on CAM 400, were a previously unknown CSO (CAM 401B), a cross-connection at Vassar Lane, extensive interconnections at CAM004 area, and more illegal sanitary connections. The connections are between sanitary (sewer) and drainage (stormwater) systems. Another finding was the need for new localized projects using innovations such as interceptor connection reliefs, siphon reliefs, and hydraulic relief gates.

The NPC (Notice of Project Change for the Long Term CSO Control Plan) is a document that is updated periodically to thoroughly describe alterations in the possible plans and new discoveries about misinformation on the location and status of CSOs. The most recent copy outlines 19 different alternative plans to reduce or eliminate CSOs. Only one of the plans, the one to separate all CSOs, will allow the Mystic watershed to attain class B status. Of course, this plan is by far the most expensive. The other alternatives include combinations of storage basins, partial CSO elimination, discharge treatment, and relocation. These will all hold MWRA accountable to reduce CSO discharge by 95%. It is important to note that even if total separation is achieved, bacteria will still get into the watershed through the feces of dogs, birds, and other sources.

Environmental Monitoring for Public Access and Community Tracking (EMPACT) is an EPA program that aids communities in quickly amassing and publicizing environmental data. Somerville has received a $363,257 grant from this program to monitor the Mystic River. In addition to sewage contamination, the Mystic River has been overwhelmed with chemicals, hydrocarbons, pathogens, and road salt from

stormwater runoff. The Mystic Watershed Collaborative (a partnership between the Mystic River Watershed Association and Tufts University) has been designated to run the project, and it monitors fecal coliform bacteria, dissolved oxygen, conductivity, pH, and water depth at least five times per week. This, in addition to other community awareness programs has helped to stimulate public concern.

5. CURRENT STATUS OF CSO CLEANUP IN THE MYSTIC RIVER WATERSHED

MyWRA, the Alewife/Mystic River Advocates, MWRA, and USGS have been testing samples from the watershed at different locations and intervals to monitor water quality. So far, 6 out of 14 CSO outfall pipes in the Mystic watershed have been closed so that no more sewage can flow from them.

Table 7 is a summary of the cost of work items that have already been completed or committed to be completed.

Element	**Total Cost**
Outfall Cleaning (Contract 1)	$452,500
Fresh Pond Parkway (Contracts 2A and 2B)	$16,171,900
Orchard Street Separation (Contract 3)	$2,509,500
Engineering on Contracts 1 to 3	$6,994,400
Floatables Control (Contracts 4 and 5)	$1,730,400
New CAMO04 Outfall (Contract 12)	$10,395,000
Berm	$300,000
MWRO03 Floatables Control	$300,000
Contingency (Contracts 4,5 and 12)	$1,649,500
Engineering (Contracts 4, 5 and 12, and amendments)	$9,560,600
TOTAL	**$50,063,800**

So far, over $50 million has been spent, and most of it has gone to work along Fresh Pond and for CAM 004.

Figure 2 shows the systemwide map for the MWRA area. Most of the CSOs to be eliminated are located south of Boston, because the MWRA outlines “sensitive use” areas that should benefit from total separation while just minimum treatment of CSO discharges is deemed sufficient in less-sensitive areas. The total spending of the MWRA for all CSO reduction was originally estimated at $430 million in 1997, and has now risen to $530 million.

The Mystic River drains into the Boston Harbor. There are several segments of the Watershed: the Aberjona River, Malden River, Alewife Brook, Mystic River, and the Chelsea River (Segments MA71-01 to MA71-06). The last three of these contain CSOs. The first of two are stably classified as class B, and do not face the danger of reclassification to B_{CSO} Variance.

Cities are given NPDES permits for how much their CSOs can overflow and how many times per year. 6 cities have been given Notices of Noncompliance (NONs) for going beyond their permits, and Belmont exceeded its the most. The city of Somerville was issued NPDES permits to discharge combined sewage through six CSOs to the Alewife Brook. However, the permits expired in September of 1997, and Somerville has supposedly removed five CSOs. The problem is that these permits are enforced only

through warnings and do not even have to be renewed until five years after they expire. Somerville was issued several NONs for discharging in excess of what was permitted, but not much else was done. Cambridge also has a permit to discharge into the Alewife Brook through seven CSOs. Its permit expired in April 1998 but is expected to be reissued.

Dry-weather sampling programs have established many storm drains in the Alewife Brook that appear to be discharging wastewater flows. The DEP has issued NONs to towns in the watershed requiring identification and removal of illegal connections to storm drains. This process takes a long time, and these pollution sources are slowly being removed one by one.

6. KEY ISSUES AND THE FINAL DECISION PROCESS

The only way to maintain Class B status is to eliminate CSOs through sewer separation. The DEP CSO guidance document explains ways to evaluate the feasibility of sewer separation.[xvii]

- Cost – to determine if the impact on ratepayers is excessive, using EPA's guidance
- Benefits – allows consideration of impacts of pollution from storm drains
- Protection of sensitive uses – if CSOs are not completely eliminated, alternatives "must provide an equivalent or higher level of environmental benefit…"[xviii]

Discussions with Mr. Kevin Brander of DEP indicated that cost/affordability will be a key criterion in the final decision on water quality classification. Mr. Brander stated[xix] that the following steps will lead up to a decision on water quality standards. These steps are shown in **Figure 3** (Figure 1 in DEP's CSO guidance document).

1) The CSO Control Plan in the Alewife/Mystic watershed must be completed by July 1, 2003. This document is required under the CSO Variance. A notice will be placed in the *Environmental Monitor*, and the document will be subject to the MEPA environmental review requirements (301 CMR 11.00). Public comments will be solicited on the plan.

2) DEP will hold a public forum during the MEPA comment period to allow MWRA to present technical information in the final plan publicly and to hear public comments.

3) DEP will consider the information included in the CSO Plan and public comments, and determine if the recommended plan is the highest feasible level of CSO control. The highest feasible level of CSO control will be determined from the technical analysis of the costs and water quality benefits of the range of CSO control alternatives and on the financial capacity of MWRA and its ratepayers.

4) If CSOs will be eliminated, no change to the present water quality standard is required. If CSOs will be mitigated but not eliminated, DEP will need to develop a Use Attainability Analysis (UAA) for submittal to EPA "to document that achieving a higher level of CSO control is not feasible or appropriate."[xx]

5) In the case of a standards change (which is equivalent to a change in the state regulations - 314 CMR 4.00), DEP must publicly announce its intention of changing the standard, hold a public hearing on the tentative change, and publish a notice in the *Environmental Monitor* so there will be opportunities to provide input and public comment at the hearing and in writing to the MEPA office.

6) EPA, upon receipt of the UAA, will have 60 days to approve the standards change, or 90 days to disapprove the standards change.

7) Upon EPA approval, the standard would be formally changed and a NPDES (discharge) permit would then be issued to the CSO permittees requiring the level of CSO control associated with the highest feasible level of control as identified in the approved CSO control plan (and UAA).

8) The Clean Water Act requires the state to conduct a public review of the water quality standards every three years (triennial review), so any standards changes would be subject to additional review and scrutiny by the public, and the information that supported the standards changes (e.g., affordability) can be revisited during those reviews.

Before EPA makes its decision in October 2003, the main way for the community to voice its opinion is at the public meeting. This will happen after the final CSO plan is submitted on July 1, 2003. It is important for people to comment on the following points:

1) Residents have a right to live by clean water; and the cost is high at first, but will pay off in the future.

3) Residents who do use the Mystic recreationally, or those who would like to (were it clean), can state what it means to them.

3) Children that play along the river and streams can state why they would like the water to be clean.

The public can also appeal certain permits and the decision in general if the Mystic is classified as B_{CSO}.

7. RECOMMENDATIONS

Our team recommends that MyRWA try to influence the decision makers in advance of the public comment period. The following approaches could be considered:

- Request extension of the variance
- Request funding and phasing
- Insist on the triennial review required by the CWA
- Approach Boards of Health
- Demonstrate value of waters to the community
- Collaborate with other watershed associations
- Consider a citizen suit

7.1 Request Extension of the Variance

DEP feels it has enough information to make a decision on water classification. However, MyRWA could request an extension of the variance based on the following:

- Data gaps – Extension of the variance would allow more time to fill in gaps in data presented in MWRA's long-term CSO control plan
- TMDLs – The “demonstration approach” used by MWRA in its CSP Facilities Plan requires calculation of total maximum daily loads.[xxi] The facilities plan should be reviewed to see if it includes TMDLs. If it does not, MyRWA should call this omission to the attention of DEP and EPA

- Dry-weather discharges must be eliminated, per CWA
- Stormwater impacts – Final water quality classification cannot be determined until stormwater controls are implemented
- Sensitive areas – Are there any endangered or threatened species? DEP's Kevin Brander indicated that no one has studied impacts on fish or the levels of pollutants in fish tissue. We suggest that MyRWA contact the Department of Fish & Wildlife and request that it immediately initiate a study of pollution impacts on fish in the Mystic watershed.
- New technologies – An extension may allow time for new CSO control technologies to emerge

7.2 Request Funding and Phasing

MyRWA can also request that implementation of CSO controls be phased in to reduce cost impacts. The CWA (§1342(q)) allows implementation to be phased in, and phasing of implementation would be preferable to a change in water quality status.

To address concerns about the cost of CSO elimination, MyRWA could urge CSO communities to apply for grant funding under recent amendments to the CW:

- Sewer overflow control grant (CWA §1301)
- Wet weather watershed pilot project (CWA §1274)

Cities like Chelsea and Somerville may meet the "financially distressed" criteria for grant funding.

7.3 Insist on the Triennial Review

It appears that DEP has not reviewed the surface water discharge standards in more than three years, as required by §1313 of the CWA. The triennial review provides an opportunity to determine whether or not the B_{CSO} standard violates the CWA. MyRWA should confirm the date of the last triennial review, and then request that EPA direct DEP to review the standards.

7.4 Approach Boards of Health

Massachusetts law (MGL c. 40) gives boards of health the authority to adopt regulations to protect public health, safety, and welfare. MyRWA could approach the boards of health in Cambridge, Somerville, Arlington, Medford, Chelsea, or other communities and urge the adoption of more stringent water quality standards based on public health concerns.

7.5 Demonstrate the Value of the Waters to the Community

Sensitivity of uses is a key criterion in determining water quality classification. Currently, there is a perception among regulators that Alewife Brook is "not a heavily used resource." It is critical for MyRWA to counter this perception and demonstrate to regulators that the Mystic watershed waters are valued by the community. Evidence could be gathered by:

- Conducting surveys
- Collecting signatures and petitions
- Taking photos of community events
- Working with schools to develop curricula using Alewife Brook and the Mystic River as a "living classroom"

7.6 Collaborate with Other Watershed Associations

Areas of collaboration could include:

- Bringing political pressure on DEP and EPA through both state and national representatives and senators
- Initiating a citizen suit under the CWA

7.7 Consider a Citizen Suit

One basis for a citizen suit could be that the Bcso standard does not protect public health or welfare, as required by the CWA (§1313(c)(2)). Furthermore, the B_{CSO} standard does not comply with the CSO Control Policy and therefore violates the CWA. The CSO Control Policy states: "A primary objective of the long-term CSO control plan is to meet WQS, including the designated uses through reducing risks to human health and the environment by eliminating, relocating or controlling CSOs to the affected waters."[xxii]

It can be argued that it is not worth paying almost double the cost just to eliminate the remaining 5% of the CSOs. However, there is so much uncertainty involved, that the payoff might be worth this cost. For instance, the number of residents in the Mystic watershed will continue to increase in the future, leading to more sewage and waste. In addition, global warming is speculated to increase flooding and cause more extreme temperatures. Alternatives to complete sewer separation might lead to short-term solutions, but the only way to ensure that the water will remain clean is total separation.

The precautionary principle applies especially to this case, because there is so much uncertainty. A future drastic event (flood, storm, etc.) has the potential to damage the Mystic waterways to where they would be even more expensive, and maybe even impossible, to repair. In addition, that remaining 5% of CSO discharge may not seem like much, but it is enough to keep the Mystic waterways from being fishable and swimmable. Any amount of raw sewage being dumped into the river makes it unhealthy. It will still lead to an unpleasant color, odor, and the presence of bacteria. The government made a commitment to ensure that citizens live among fishable and swimmable water bodies when it created the Clean Water Act. If the authorities responsible for meeting this commitment are unwilling to do so, then citizens have the right to challenge them. In fact, the CWA (§1251(e)) encourages public involvement in enforcement of the regulations.

LIST OF ABBREVIATIONS

CSO	Combined sewer overflow
DEP	Department of Environmental Protection (Massachusetts)
EOEA	Executive Office of Environmental Affairs (Massachusetts)
EPA	Environmental Protection Agency (U.S.)
MEPA	Massachusetts Environmental Policy Act
MWRA	Massachusetts Water Resources Authority
MyRWA	Mystic River Watershed Association
NON	Notice of noncompliance
POTW	Publicly owned treatment works

Footnotes:

[i] Mystic Monitoring Network Yearly Review: Baseline Water Quality Data for the Watershed, July 2000 – February 2002.
[ii] The map in Figure 1 was supplied by Grace Perez of MyRWA.
[iii] Tables in this document are from the Massachusetts Water Resources Authority, *Notice of Project Change*, 2001.
[iv] 33 USC §1251. Congressional declaration of goals and policy.
[v] U.S. Environmental Protection Agency. *Report to Congress on Implementation and Enforcement of the Combined Sewer Overflow Control Policy*. September 1, 2001.
[vi] Ibid.
[vii] U.S. Environmental Protection Agency. *National Combined Sewer Overflow Control Policy*. April 19, 1994.
[viii] Ibid., p. 9
[ix] Ibid., p. 25
[x] Ibid., p. 31
[xi] Massachusetts Department of Environmental Protection. *Guidance for Abatement of Pollution from CSO Discharges*. August 11, 1997.
[xii] E-mail Communication from Kevin Brander of Massachusetts DEP, Nov. 5, 2002.
[xiii] Massachusetts Water Resources Authority. *Combined Sewer Overflow Facilities Plan and Environmental Impact Report*. EOEA No. 10335. July 31, 1997, Vol I, p. 6-15.
[xiv] Ibid, Vol. I, Table 7.2-1
[xv] Massachusetts Department of Environmental Protection. Final Administrative Determination for CSO-Impacted Waters within the Massachusetts Water Resources Authority (MWRA) Sewer Service Area, December 31, 1997.
[xvi] Conversation with activist and Mystic kayaker, Roger Frymire.
[xvii] Massachusetts Department of Environmental Protection. *Guidance for Abatement of Pollution from CSO Discharges*. August 11, 1997, p. 6.
[xviii] Ibid.
[xix] E-mail communication with Kevin Brander, Massachusetts DEP, November 5, 2002.
[xx] Massachusetts Department of Environmental Protection. *Guidance for Abatement of Pollution from CSO Discharges*. August 11, 1997, p. 10.
[xxi] U.S. Environmental Protection Agency. *National Combined Sewer Overflow Control Policy*. April 19, 1994.p. 19.
[xxii] Ibid., p. 24