

Introduction

The Chesapeake Bay is a body of water that flows through several states and it is facing the major problem of pollution. The Bay is a watershed – it receives water from many sources such as rivers, streams and lakes. (Chesapeake Bay Program 2007) It drains an area equal to 64,000 square miles and includes part or all of the states of Delaware, Maryland, New York, District of Columbia, Pennsylvania, Virginia, and West Virginia. It is the largest “coastal” body in the world. (Chesapeake Bay Program 2007) The tributaries found in these states are the main carriers of the pollutants that continue to contaminate the Bay in high numbers. There are over a 100,000 streams and rivers that flow into the Bay, that are filled with some of the pollutants that contaminate the Bay: sediments and nutrients such as nitrogen and phosphorus. These pollutants are continually affecting the lives of the plants, water, and the millions of creatures that reside in the Bay. This paper will focus on the problem of erosion and sediment build up in the Bay. One of the causes of sediment buildup is urbanization. Using the states of Maryland, and the Virginia as case studies, I will discuss and analyze several policy options suggested by these states. Lastly, I will make recommendations on the policy that will be most effective at lowering the amount of erosion and sediment that flows into the Chesapeake Bay.

Origin of the Problem

One of the struggles faced by scientists and organizations that are making efforts to solve the problem is the ongoing issue of determining the specific source. Erosion and sediments are types of pollution characterized as non-point source -- the exact producers of the pollutants are unknown. This type of pollution is commonly a result of agricultural

runoff. Non-point source pollution is difficult to measure and it is difficult to establish methods to prevent the problem. One of the causes of non-point pollution such as erosion and sediment is the ongoing problem of urbanization. Urbanization is the movement of a rural “population” to more urban areas, and this includes turning forest areas into more urban areas. Another issue that is connected with urbanization is called urban “sprawl” which also has caused increased pollution from erosion and sediments. These are caused by increases in population, and as a result of movement from rural to the urban or suburban areas. (Walls and McConnell 2004)

According, to Walls and McConnell (2004) 34% of nitrogen loads and 36% of phosphorous loads flow into the Chesapeake Bay Watersheds as a result of urbanization. An interesting fact is even though urban areas only account for 9% of land coverage; their contribution to the watershed pollution is quite significant. (Walls and McConnell 2004) One of the major causes is new development, which commonly leads to large amount of sediment erosion, since there is a large increase in impervious surfaces. Studies have shown that one of the more recent solutions used in new development projects is to use smaller pieces of land to decrease the amount of erosion from impervious surfaces. (Walls and McConnell 2004) Some of the effects of urban sprawl and urbanization are fertilizer run-off, a decrease in forest, increase sediment build up, and erosion. Therefore, it is evident that “sprawl” and urbanization can be used interchangeably because they are both commonly used when discussing non-point source pollution.

Policy Options –

According, to studies that have been carried out by states and organizations it has

been determined there are many different policy options that will assist in alleviating the problem of erosion and sediment. The policies are all focused on enforcing the Best Management Practices, BMPs that have shown to be most successful at combating the problem. According to the EPA the BMPs which focus on erosion and sediment in urban areas focus on construction sites, and operation and maintenance. (EPA 1995) The BMPs for construction sites are filter fabrics, sediment basins, and stabilized entrances. (EPA 1995) The operation and maintenance has included general maintenance and permanent maintenance, which focus on seeding with grass and fertilizer, wildflower coverage, terracing, detention ponds and basins, and constructed wetlands. (EPA 1995) These methods act as buffers which are effective at filtering the pollution caused by urbanization and sprawl. Of the BMPs discussed the one many policies confront are the sediment and detention ponds, which are both temporary and permanent infrastructures that have helped to lower the amount of sediment run-off. (EPA 1995) Some other BMPs for “erosion and sediment are silt fences, slope drains, and vegetation” which act as some of the more effective methods in the West Virginia Tributary. (WVPTS 2004)

Policy Analysis- Virginia

The command and control method is one that the state Virginia uses as well to combat the problems of urbanization which results in erosion and sediment run-off. Virginia had a population of about 7.6 million in 2006, and it has increased by about 8% since 2000. (Census Bureau 2006) As mentioned earlier population growth leads to increased production, and a need for more housing and other infrastructures. Along with these increases is need for the implementation of policies that control the amount of erosion and sediment produced as a result of the urbanization. The government has

established a soil and water conservation in which one of the components is the controlling of erosion and sediment. In 2004 the National Pollutant Discharge Elimination System (NPDES) programs was established by General Assembly with goals of regulating and controlling the development of urban areas. (DCR 2007) The program is individually operated in different local government, and it is their responsible to insure that the regulations are followed, and to measure the amount of success. (DCR 2007)

The Erosion and Sediment Control program which was established by the Department of Conservation and Recreation under the *Erosion and Sediment Laws* over 30 years ago. (DCR 2007) The main goals of the program are as follows: “is to control soil erosion, sedimentation, and nonagricultural runoff from regulated "land-disturbing activities" to prevent degradation of property and natural resources”. (DCR 2007) Also, Virginia is the first state to implement an erosion and sediment control program that focused on the problems caused by construction sites. (DCR 2007) Virginia has established a comprehensive program that includes the efforts of mainly the developers, and constructors but it does except to inhabitants, or business owners. The program mandates that each local government in Virginia implements a program that is based on the principles, goals, and regulations of the state ESC program. (DCR 2007) They have included that all individuals involved in the process are affected by the effectiveness of the program, since there are consequences that have been outlined by the program. Another key component that Virginia has included is it their goal to insure that the benefits of meeting the regulations outweigh the cost of carrying out the process, because they have recognized that increased cost lead to higher prices to the consumers.

In order to carry out the program, they have established rules and regulation for

the “land disturbing” activities of the constructing. These programs require that any construction project that disturbs at least 2,500 square feet have a City approved construction pollution prevention plan and install appropriate construction site runoff controls to meet the goal of reduced pollutant discharge to the City's streams. (T&ES 2008) The idea behind this policy is to lower the amount of erosion and sediment that is caused by the constructing of large pieces of land. The main focus of this policy is to set regulations for the contractors and builders, but the policy states that the individuals that are most responsible for insuring the regulations are followed are the landowners. Therefore, both the landowners and the construction workers carry the burden of the rules, and regulations that have been created to insure that the land is being disturbed in the most effective manner.

The pros of the program are that the program is completely comprehensive in terms of providing contractors with the restrictions, but the regulations are not of such that developers are unable to abide by the rules. Also, they have created an existence list of regulations and requirements that all developers are required to follow. One key component of the program is that it oversees the local programs, but they allow the individuals places to determine the specifics of the program, and the methods they take to carry out the process. The program has included the rights of citizens which insure that the developers are not economically benefiting by increasing the cost to the home buyers, because of the additional work. (WVDHSEM 2008) Also, Virginia has agencies that inspect the areas that are being developed, to insure that the regulations are being followed by all parties involved and if they fail to abide by the rules they have established a fine system.

Though the program has many positive aspects there are cons that are related to the program, and the major ones are the high transaction cost to contractors, and there was not any substantial information on the BMPS. One may assume that these BMPs are just general practice for all of the erosion and sediment programs, but the overview focused on the restrictions and licensing versus the methods. For example, some of the local programs use permits to distribute land to contractors and developers, which include “administrative fees, and performance surety” determined by each local program. Also, the program does not specifically mention the cost or benefits of implementing the programs which makes it difficult to analyze the success of the program. One con that could be addressed by the individuals states are methods of measuring their success, because it seems to be difficult to measure the amount of benefit that is coming from their efforts. That is one is the drawbacks to implementing the BMPS because they are just methods that have been established to lower the amount of erosion and sediment run-off. It is important to determine the cost and benefits of implementing a program, and I would recommend establishing a method that will enable the state to determine the amount of change the 30 year old program has made in the Watersheds that surround their state.

Another key component that is vital to implementing an effective program is the heavily weighed on the cost-sharing problems, and the party that carries the greatest burden. In this program the burden seems to be on the contractors, rather than the current and future residents. One problem with placing the burden solely on the contractor the residents when then have to share the cost through increase in sale price, but they lack responsibility for the pollution that may continue after the construction of their home. Therefore, Virginia’s program should include some type of role played by the residents

even if it is in a form of an additional fee that is known prior to purchasing of the home, which leads to all parties involved aware of the problems. The method of cost sharing with the government is common in most of the states that contribute the pollution, but the cost to the residents seems to be involuntary. Economists have recognized that voluntary efforts typically lead to free riders, but even if it is involuntary it would be more effective if residents were aware of the cost of limiting erosion. Overall, the ESC program has the foundation of a successful program, because they have established goals and methods to insure the state is accomplishing those goals.

Conclusion

In conclusion, the Chesapeake Watershed continues to face the effects of urbanization and urban sprawl, but the surrounding states are taking the necessary steps to decrease the amount of erosion and sediment run off. Therefore, the problem is not that states are not making the effort; rather it is that many of the programs lack comprehensiveness, adequate follow-up and inspection programs, and some of the goals and regulations are unrealistic. One unique aspect of the Virginia program is that they include the importance of recognizing that the problem is going to be controlled, and they have created a foundation that has the potential to command that the entire population participate in the efforts. After analyzing the program I would recommend that the construction site aspect of their ESC program be implemented by other states that face similar run-off problems, because statistics have shown that changes in “land disruption” and “urbanization” make a difference in the amount of run-off produced. According, to data erosion is “200 times greater in construction areas than in cropland, and 2,000 times greater than the natural occurrences in the woodlands”. (WVDHSEM 2008) One state

that may consider implementing the guidelines, regulations, and courses would be Maryland since they have an ESC program in their state, but they have not established such as a program as Virginia.

One recommendation for the Virginia program would be to analyze the methods taken on by the West Virginia Tributary programs, which has a comprehensive website that includes the necessary BMPs depending on the problems, success stories and statistics. In West Virginia, the policies seem to be more details outlined in terms of goals and the benefits of the program. Therefore, my final recommendation to Virginia would be analyze the successful approaches of surrounding states, since the program is new, changes will be easier at this stage in the process. Overall, there seems to be hope for the Chesapeake Bay Watershed, but it will take the implementing of effective and comprehensive programs that holds all of the population accountable for ensuring that the goals are met.

Bibliography

- Chesapeake Bay Program. Facts & Fictions. <<http://www.chesapeakebay.net/factsandfigures.aspx?menuitem=14582>>. (accessed March 2, 2008)
- Department of Conservation and Recreation (DCR). Virginia's Erosion and Sediment Control Program. 24 Oct. 2007. <http://www.dcr.virginia.gov/soil_&_water/e&s.html>. (accessed March 18, 2008)
- Department of Transportation and Environmental Services "*Erosion and Sediment*" 08 April 2008, <http://www.alexandriava.gov/tes/info/default.aspx?id=3822> (accessed April 8, 2008)
- MDE-Maryland Department of the Environment. "Maryland Erosion and Sediment Control Guidelines.". Jan. 2004. <<http://www.mde.state.md.us/assets/document/State%20Erosion%20Control%20Guidelines.pdf>>. (accessed March 18, 2008)
- MHA-Maryland Highway Administration. "Quickfacts." Maryland Highway Administration.<<http://www.sha.state.md.us>>. (accessed March 18, 2008)
- WRAS- Watershed Restoration Action Strategies. "Stormwater Programs (MDE) and WRAS." 16 Apr. 2004.<<http://www.dnr.state.md.us/watersheds/wras/relationship.html>> (accessed March 18, 2008)
- Walls, Magaret, and Virginia McConnell. "Incentive-Based Land Use Policies and Water Quality in the Chesapeake Bay." Resources For the Future (Mar. 2004): 173-175.
- West Virginia Division of Homeland Security and Emergency. WVDHSEM. 2008. http://www.wvdhsem.gov/WV_Disaster_Library/Library/Environmental/Erosion%20and%20sediment%20control.htm (accessed April 8, 2008)