Karen V. Torres

Environmental Policy

Dr. Amy McCormick Diduch

Command and Control Regulation of Pervious Pavement

Introduction:

Storm water runoff is any precipitation in an urban or suburban area that does not evaporate or soak into the ground instead it pools and travels downhill. (Chesapeake Bay Program [8]) The problem with the storm water runoff is that it carries with it nutrients, sediments, and other chemical contaminants as it travels through things such as parking lots, roads, yards, homes, parks, and construction sites, which eventually end up in the storm drains and waterways that drain into the Bay. (Chesapeake Bay Program [8]) In addition to that, the increased development around the Bay water shed has made storm water runoff the fastest growing source of pollution to the bay and its surrounding rivers. (Chesapeake Bay Program) Furthermore, another negative effect storm water runoff has on the Bay and its surrounding environment is that the storm runoff that goes through construction sites of new development areas ends up picking up muddy runoff which contributes to the amount of sediment the bay and its tributaries accumulate. (Chesapeake Bay Program [8]) The contaminants that are coming from the storm water runoffs are affecting the fish that live on the Bay and its tributaries in the way that they become so stuffed with polychrolinated biphenyls, mercury, and other contaminants to the point that people now prefer to get their fish from supermarkets than at the dock which affects the local fisheries or business that rely on the fish from the bay and its tributaries. (Powledge, 2005) The biggest problem

with the Chesapeake Bay is that the water quality is being so degraded with all the contaminants such as phosphorus and nitrates which encourages destructive algae growth and then there is the deprivation of oxygen in the bay water which ends up suffocating crabs and other species in the bay. (Powledge, 2005) Other negative effects of storm water runoffs on the environment include the erosion of stream banks and damage to the aquatic habitat in hundreds of miles of the streams in the bay water shed. (Chesapeake Bay Program [8]) For those that think that these things don't affect them, they should also keep in mind that storm water runoffs also contribute to an increase in flooding in urban and suburban areas, so in other words these water runoffs affect a lot of things at the same time. (Chesapeake Bay Program [8])

The chemical contaminants that the storm runoffs carry are things such as phosphates and nitrates. (Gillies [6])The Chesapeake Bay is contaminated with higher levels of phosphorus and nitrates that come from non-point sources. Non-point sources are those sources that are hard to identify where the pollution is coming from ever since they come from everywhere so you really can't point a finger at something. (Cacapon Institute [7]) The problem with the higher levels of nitrate in the streams is that the microbial processes that occur at the stream bed interface process nitrate in a number of ways including removal via conversion to gaseous nitrogen which has the greatest effect during low flow conditions. (Gillies [6])

Policy Options:

One policy option that would be great to consider is to have a encourage pervious pavement on new developments such as parking lots, driveways, and sidewalks. There are different ways this could be achieved. First we could simply

requiring its use in all new developments allowing already existing sites that are parking lots, drive ways, sidewalks, etc. until 2015 to try to make these changes. This would be a command and control regulation. A second way to achieve this same goal would be to give subsidies to those that switch or decide to use the pervious material in the way that we would give them some kind of tax breaks for using this. A third option would be to simply just tax regular concrete to the point that the cost of using regular concrete would be the same as using pervious concrete. In my opinion I think that these three options would be the best one even though I favor the first one more than the other two. The difference between the subsidies and the command and control regulation is that with the subsidies not everyone will do it because it would be only if the person wants to make the change as compared to the command and control regulation in which everyone will have to do it. In addition to that another problem with subsidies is that the state government in a way will be giving them money for doing these changes, while the money could be used in something else as replacing sidewalks or parking lots on parks that the government owns with pervious pavement. At the same time, pervious is not significantly more expensive than regular concrete, so it would be just a waste of money in giving people subsidies. On the other hand, the problem with placing a tax on regular concrete is that fixing roads will become more expensive ever since for roads, highways, and streets the best thing to use is regular concrete ever since vehicles get more milage on it compared to the pervious concrete.

Policy Analysis:

Pervious pavement is designed to allow perculation or infiltration of stormwater through the surface into the soil below where the water is naturally filtered and

pollutants are removed. (deluthstreams.org) There are different types of pervious pavement. For instance, there is poured-in-place pervious asphalt, poured-in-place pervious concrete surfaces, block and concrete modular pavers, and gridpavers. (deluthstreams.org) The physical difference between pervious concrete and regular concrete is that pervious concrete has a lower water to cement ration and its appearance kind of looks peebly sort of like a sponge which allows it to take in the water. (deluthstreams.org) The ways pervious pavement affect stormwater runoff is that with its peebly texture it is able to reduce the pollution coming from the runoff by a process of absorption, filtration, and microbiological filtration.(deluthstreams.org) By these processes, pervious pavement is able to remove 82-95% of sediments, 65% of the total Phosphorus, 80-85% of Nitrogen, and it also has high removal rates of Zinc, Lead, Chemical Oxygen Demand.(deluthstreams.org)

The policy option that I think would work the best and that I like the best would be the one with the command and control regulation of using pervious pavement for new developments and for existing developments, parking lots, and drive ways to change their present pavement to pervious pavement from the time this act goes into effect, so they would be given a deadline for it to be done by the year 2015. This command and control regulation would be affecting all business owners, businesses, construction sites, and people that live or reside in the state of Virginia, Maryland, and the District of Colombia, so in other words those that fall under this would be paying for it. The estimated cost for the use of pervious pavement would be somewhere around $130 per cubic yard for pervious asphalt which happens to be around six to ten percent more expensive than regular concrete, but in the long run it is worth the cost due to the

results that are going to be achieved by the use of it. (Bergeron 2007) The maintanence cost of the use of pervious pavement is around $200 per acre per year which in the long run turns out to be better because one will not have to replace it every so often like regular concrete. (deluthstreams.org)

The benefits of using pervious pavement are that number one it is the EPA's best management practice for storm water runoff in the way that it is able to absorb the water so not that much will leave in the runoff and be able to carry those pollutants that are affecting the bay, in a way it kind of acts as a sponge or filter to trap all the bad stuff like pollutants such as phosphates, nitrates, and heavy metals from getting to the streams. (Bergeron 2007) Another advantage of using pervious pavement is that it helps recharge or refill ground water levels which happens to be a source of where the daily water we use comes from. (NRMCA [1] 2008) In addition to that, the use of pervious pavement creates more efficient land use in the way that it would eliminate the need to use retention ponds, swales, and other storm water management practices, so they would be able to use the space they were going to use for that in something else.(NRMCA [2] 2008) A very beneficial advantage of using pervious pavement is that it increases the driving safety of drivers in wet conditions ever since the rain is able to seep down the concrete instead of remaining in the surface. (NRMCA [3] 2008) In addition to that the use of pervious pavement also helps reduce the ice build. (deluthstream.org)The total amount of pollution that would prevented would be that with the regulation of the use of pervious pavement is that now there would be a reduction in the amount of oil, anti freeze, and other automobile fluids that get washed away from impervious surfaces to the streams, lakes, oceans, and bays when it rains. (NRMCA [1]

2008) Also another benefit of pervious concrete is that it is a light color which absorbs less heat from solar radiation than darker pavements, so it stores less heat which helps to lower the heat of island effects on urban areas. (NRMCA [1]) In other words, with the light color of pervious pavement it is able to reduce heat pollution.(deluthstreams.org)

Some of the problems with using pervious pavement is that its initial cost is six to ten percent more expensive than regular concrete which might not be as attractive to people, but in the long run it would be cheaper, yet this is the problem because people are more concerned about what they get now than later. In connection with that, the initial cost of pervious pavement is more expensive due to the reason that it is very slow and stiff and it takes a lot of work to get it out from the truck and it requires a lot of different tools. (Bergeron 2007) Another problem is that cars get more mileage on roads made out of concrete than on those made out of pervious pavement, so although we might be reducing the pollutants that are getting to the Chesapeake Bay by storm water runoff, in a way we would be using more of a non renewable resource which in this scenario it happens to be oil. (Bergeron, 2007) The good thing is that the pervious pavement is only going to be used on sidewalks, driveways, pathways, and parking lots. Furthermore, another problem that might occur with the pervious pavement is that although having them will reduce the number of floods ever since it would be able to absorb some of the water that's coming in, at the same time if the pervious pavement is not taken care of it itself can be able to contribute to flooding, so in other words it can work with us and against us. (NRMCA [4] 2008)

Conclusion:

All in all, the command and control regulation of the use of pervious pavement on parking lots, driveways, and development areas would be the best way or best choice to control the storm runoff that comes from non point sources due to the reason that by this regulation everyone will be affected, so basically all the non point sources will be affected in some way in which the pollutants would be reduced due to the reason that the harmful stuff would get filtrated in the pervious pavement so the water that doesn't get soaked up in the pavement to the ground would be less harmful to the environment when it reaches the streams and bays. (NRMCA [1] 2008) Furthermore, the use of pervious pavement will not only benefit in the long run the environment which in this case it happens to be the Chesapeake Bay and its streams, but it would also benefit us with the refills of groundwater which is a big plus due to the reason that today the levels of ground water are dropping dramatically, driver's safety when it rains ever since the pervious pavement will be absorbing the water so the parking lots won't be as slippery therefore reducing the accidents that happen in parking lots, better use of land or property in the way that businesses will have more space to use for parking lots ever since they won't have to use land on retention ponds which are unattractive when it doesn't rain yet affecting the image of the property, and the prevention of floods which will be some less money someone will have to spend on the damages done by the floods. (NRMCA [1] 2008) Overall the impact that the pervious pavement will have on the Chesapeake Bay is that the pervious pavement is going to reduce the amount of chemical contaminants that reach the bay, so what does manage to get in the bay it won't be as harmful to the aquatic life that lives on the bay as it did before. Therefore, the population of oysters and other species that were affected will be restored. Most

importantly the future population of the oysters and other species will not be as stuffed up with mercury and other chemicals which will not be only safer for the species themselves, but it would also make it safer for people to consume them, so then people will be buying their sea food from the dock instead of going to the supermarket.

The use of pervious pavement is a better option to address the problem of how the water quality of the Chesapeake Bay because it will affect everyone due to the reason that everyone will have to change to pervious pavement in the way that they will have to replace sidewalks, driveways, parking lots, and pathways with pervious pavement. Therefore, the contaminants that come from non point sources would be targeted and the impact of those non point sources on the bay won't be as big ever since there would be pervious pavement which will filtrate those chemicals from the water before it reaches the bay. In addition to that, if other options are taken into consideration, they will not have the same impact as the command and control regulation of pervious pavement ever since those other options won't be as uniformed because they won't apply to the whole population itself, it will only apply to certain people such as farmers, factories, or corporations which will still leave other non point sources unaffected.

Sources:

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