

Jessie Blekfeld-Sztraky

Econ 277

Diduch

April 9, 2008

Agriculture Pollution

Located on the eastern seaboard, the Chesapeake Bay is the largest body of coastal water in the United States. Rivers and streams of six states all connect and travel outpouring into the Chesapeake Bay. The Bay is home to millions of different plants and animals as well as provides recreational fun for millions of people. A body of water, which serves multiple services, is also massively polluted by point source and non-point pollution. There are three major pollutants that have been found to greatly harm the Bay. Nitrogen, phosphorous, and sediment are the three largest contributing pollutants found in the Bay. All three of these pollutants contribute to lowering the water quality. One of the primary ways these pollutants enter the Bay is by traveling down rivers and streams because of run-off and poor practices on farms and croplands. Both nitrogen and phosphorus are found in the fertilizers, which farmers use to encourage crop growth. Sediment becomes a problem because of topsoil and soil erosion. Soil erosion results from dirt being exposed to the elements without having anything planted to hold the soil in place, without vegetation in the soil, elements such as rainwater and the wind move the soil and can usually find itself in nearby waterways. Excess nitrogen and phosphorus in the water causes a decrease in the level of oxygen in the water which chokes the animal

life by increasing the growth of algae blocking out the sunlight, this causes reduction the fish life in the water. Sediment pollution through soil erosion is the most common way nitrogen and phosphorus enters the waterways.

Agriculture farms are largely the culprits for soil erosion because without barriers separating waterways from crops, erosion is easy to occur with heavy rains. Governments on both state and federal levels have all stepped in with different ways to help encourage farmers to use better management practices (BMP). Best management practices are different techniques that can be implemented to help deal with run-off, pollution control, and sediment control. Different types of BMP's include buffers that separate waterways from crops, crop covers, pest management, and water irrigation systems. Farmers often are not inclined to implement these practices because the cost exceeds the benefits in the short term. Farmers are primarily responsible for the costs of implementing BMP's. The cost of BMP's to make a farm more environmentally friendly is a cost most farmers are not able to bear by themselves. If farmers use BMP's, it is actually benefiting everyone in the Chesapeake Watershed area.

One of the best solutions to the run-off problem is through Riparian forest and grass buffers. These buffers are a minimum of 35 feet wide along the waterways and because of these buffers sediment run-off is stopped and soaked into the ground before running into the waterways. The buffers act as a filtration system for the topsoil that is washed away during heavy rains. The pesticides that are being used now by most farmers are a lot harsher compared to fifty years ago because the pests have grown immune to the pesticides making it harder to kill the bugs every year. With more potent pesticides used on crops to insure crop survival, those potent pesticides are also drained into waterways,

destroying aquatic life. The riparian buffers can help limit the run off of excess soil emptying into the rivers and streams while also helping the aquatic and plant life in the rivers as well which directly effects industries such as commercial fisheries.

What aren't buffers being implemented on all farms and croplands? One reason is that by letting a 35-foot wide area on either side of a stream means the land that would have contained crops up to the stream's edge now is occupied by trees, shrubs, and grass. Farmers lose that revenue, no matter how small the plot of land because they can't fully maximize the use of the land for growth. Also with allowing trees, grasses, and other plants to flourish along the river, there will be an increased population of animals living in that new habit. Animals typically being birds, squirrels, even deer run through the crops looking for food and destroying the crops. Fencing the edge of the buffers adjacent to the fields help but not solve the problem completely. It is much easier on a farmer to use all the land possible, maximize production, discourage animals, but at the same time jeopardizing the waterways with constant run-off of sediment, nitrogen, and phosphorous. Besides the problems of animals in crop fields and not being able to use the land to the full potential, farmers also face the cost of the riparian buffers. The Division of Water Resources for the state of Delaware estimated that the cost of riparian buffers could run between \$125-725 per acre. This price is only including how much the plants would cost to plant per acre of land. Not accounted in this price are labor, maintenance fees, and cost of other materials needed.

Washington State University had an experimental buffer site where grew a crop of blueberries and had buffers lining the waterways. From their findings in three years for one acre of land it took \$7,112 in 2005 with adjusted prices. Because they did this project

over three years, they were able to calculate the maintenance costs as well as labor costs involved in taking care of one acre of land.

As a way of sharing the cost and trying to encourage farmers to use BMP's, different types of options by both the federal and state governments have been to use tax credits, incentives, and cost-share programs to help offset the costs of BMP's to farmers. The idea is that through these different programs, farmers can receive money in some form or at least a percentage of the cost in return for implementing BMP's. There are some problems with these government programs; one typical problem is that there are caps on the amount of money that will be refunded to cover the cost of the BMP's. A majority of farmers can't afford to even pay for a fraction of the cost of BMP's because the value of farming is so low.

I propose a policy for the farmers in the state of Virginia, any farmer who complies with the mandate to plant riparian buffers along the waterways will receive money in the form of a subsidy to cover the entire cost of the buffers. The goal in mind is helping reduce the amount of pollutants entering the waterways. Not only should the state government fund a 100% of the moneys to farmers to plant these buffers, but the state government should also pay farmers at least 50% of the profits being lost from the land not being utilized because it is now part of the buffer. A good example is if a farmer has land that runs against 300 feet of water, then 300 feet *35 feet of land can't be used because it is acting as the buffer. Therefore the farmer is not gaining any profit from land that is sitting there untouched. The state government should pay the farmer at least 50% of the profits for that unused land to encourage the farmer to leave the land untouched.

Subsidies are not popular with the general public as a way to help farmers with cost because the government is paying for everything. However, since it is not possible to have disposable income, the government must collect money in some way. The effective way to raise money and collect from everyone is through taxes. Because only a small population is farmers, other people often do not feel it necessary to help pay for BMP's because they don't see how agricultural pollution directly affects them. Even though the Chesapeake Bay affects every human being in the watershed, without direct contact it is often very hard to convince people to increase their taxes. However since the watershed affects everyone, by providing things such as recreation and food, fronting the money to push farmers into using BMP's is actually more cost beneficial in the long run. Through the short term, large amounts of money would be spent for the initial clean up and installation of the buffers, but in the long run less money would have to be awarded to causes and organizations to cleaning up the Bay because the pollution problem would decrease over time. Taking preventative steps now will save money in the future. Because all people benefit from a clean Chesapeake Bay it is in our interest to preserve it. Until the primary concern of cleaning up the Bay becomes top priority on the government agenda and is initiated by the government, there is not incentive for individuals to clean up the Bay by themselves; the cost is too much to bear alone.

Washington State University made a whole website exploring the economics of specifically riparian buffers. Although this website caters to farmers on the western shore, it also gave worksheets to help figure out exactly how much money the buffers were going to cost with the varying factors of the size of the land, types of buffers, and the types of crops. They have published reports of water samplings with huge reductions in

nitrate levels, 1300mg/L was recorded in a waterway adjacent to a blueberry crop, after the water moved 50 feet because of a forest riparian buffer, the level of nitrate in the water dropped to less than 1mg/L in eleven years. The deeper the roots the more nitrate can be absorbed and taken out of the water. Although Virginia isn't a producer of blueberries, this is just one example of how huge a difference can be made through riparian buffers being used next to crop fields.

Agricultural pollution is definitely one of the top sources of water pollution in the Chesapeake Bay, because it is hard to measure the exact amount of pollution coming from certain farms, makes it hard to mandate which farms are "more" responsible. In this instance it would be easier to mandate that all farms adhere to codes through subsidies to control the amount of pollution traveling into the waterways. Through subsidies farmers would have to opportunity to better their farming practices without imposing additional costs onto themselves. Because we all enjoy and benefit from the Bay in a variety of ways it is our duty and responsibility to help farmers make the necessary adjustments.

Works Cited

Agriculture. Ed. Chesapeake Bay Foundation. 2006. Chesapeake Bay Foundation. 3 April 2008.

<http://www.cbf.org/site/PageServer?pagename=exp_sub_state_agriculture>

Division of Water Resources. Ed. Delaware Department of Natural Resources and Environmental Control. 2005. Delaware Department of Natural Resources and Environmental Control. 3 April 2008.

<<http://www.dnrec.state.de.us/water2000/>>

ERS/USDA Briefing Room. Ed. Marc Ribaud. 2007. USDA Economic Research Service. 4 April 2008. < <http://www.ers.usda.gov/briefing/ConservationPolicy/>>

Riparian Buffers: Economic Tools. Ed. Washington State University. 2006. Washington State University. 30 March 2008.

<<http://www.puyallup.wsu.edu/agbuffers/econtools.html>>