

THE CHESAPEAKE BAY IN YOUR COMMUNITY: A RESTORATION PLAN

OVERSIGHT HEARING

BEFORE THE
SUBCOMMITTEE ON FISHERIES CONSERVATION,
WILDLIFE AND OCEANS

OF THE
COMMITTEE ON RESOURCES
U.S. HOUSE OF REPRESENTATIVES

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**OVERSIGHT HEARING ON THE CHESAPEAKE
BAY IN YOUR COMMUNITY: A RESTORATION
PLAN**

Tuesday, May 18, 2004

U.S. House of Representatives

Subcommittee on Fisheries Conservation, Wildlife and Oceans

Committee on Resources

Washington, D.C.

The Subcommittee met, pursuant to call, at 10:00 a.m., in Room 1324, Longworth House Office Building, Hon. Wayne T. Gilchrest [Chairman of the Subcommittee] presiding.

Present: Representatives Gilchrest, Pallone and Kind.

Also Present: Representative Cardin.

STATEMENT OF THE HON. WAYNE T. GILCHREST, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MARYLAND

Mr. GILCHREST. Good morning, everyone.

What we are going to attempt to do this morning—this is the Subcommittee on Fisheries Conservation, Wildlife and Oceans of the full Committee on Resources, and this is our hearing room.

The gentleman to my left is Congressman Frank Pallone. He is from New Jersey. Congressman Pallone, for the most part, is a co-chair on this subcommittee. We call him the Ranking Member of this Fisheries Subcommittee.

We have hearings generally twice a month throughout the year on various issues dealing with the oceans, the fisheries, with invasive species and, certainly periodically, with the Chesapeake Bay.

This morning, we are going to, for the most part, conduct our hearing in the same way that it would normally be conducted, with witnesses that come from as far away as Iceland or Australia, New Zealand, California, Alaska, Montana, and sometimes even from New Jersey. But we want to thank all of you for making the effort to come here this morning to give your testimony.

There will be lights on the table that will be turned on just the way they are turned on at a normal hearing. Generally, witnesses are given about 5 minutes to give their testimony. The testimony is always submitted for the record. The full text of the testimony and much of the information is gathered by the Members of

Congress from the witnesses as a result of the questioning that takes place after the witnesses give their testimony.

The reporter here this morning is from Centreville, and Miss Julie is most often on the House Floor taking down what Members say there. And it goes into the Congressional Record. We appreciate her coming here this morning and fighting the traffic on Route 50.

Bo Dame, to my right, is a fellow working with the Subcommittee, getting his Ph.D. in coastal resource management, which is very appropriate for this.

So I also want to thank the students for participating, and the teachers for helping them through this process, for all of the family members that have been very helpful.

Reading through your testimony last night, you touched upon just about everything that is wrong and right with human activity about the Chesapeake Bay. You have touched upon sewage waste, air deposition, septic tanks, power plants, transportation, storm water runoff, agriculture runoff, deforestation, turbidity from power boats, overfishing, disease—all of the human activity that has fragmented and degraded nature's bounty in the Chesapeake Bay.

But you also went through a variety of ways that we could resolve and solve those problems, which I will just briefly summarize from your reports. And they are: Human infrastructure needs to be compatible with nature's infrastructure. And you have done some extra work. Just two quick quotes here. George Percy, 1607—and this was in the Bay Journal, so if you get a chance to get a copy of the Bay Journal for the month of May, this quote is in there: "we are set down 80 miles within a river so stored with sturgeon and other sweets, fish, as no man's fortune has ever passed the like. And as we think, if more may be wished in a river, it will be found." so the next time you are out on the Bay in a boat or a canoe or a kayak, I think that vision can come to mind. And if we work hard enough, it can become a reality.

I guess if we talk about the Chesapeake Bay, we have to mention Captain John Smith: "heaven and earth never agreed better to frame a place for man's habitation."

So you are moving into the arena where you are the next generation responsible for that restoration. And we wanted to all work to help that transition, so that when you are sitting up here—and I encourage all of you to run for public office some time during your journey of life, to make a contribution—when you are sitting up here behind the dais as a staffer or a Member or as a reporter, reporting all of this down, you will remember this day.

So thank you all very much for coming.

[The prepared statement of Mr. Gilcrest follows:]

**Statement by The Honorable Wayne T. Gilcrest, Chairman,
Subcommittee on Fisheries Conservation, Wildlife and Oceans**

Good morning, I would like to welcome everyone to what I believe will be an exciting, educational and important hearing on the future of the Chesapeake Bay.

Earlier this year, I wrote to every high school in my Congressional District, and I challenged students at those fine institutions to identify the problems facing the Chesapeake Bay, the human activities that should be changed to help reduce those negative impacts, and to suggest ways that we can lessen those impacts in the future. I am not sure there has ever been a Congressional Hearing like this before

but I am anxious to hear the testimony of students from Bohemia Manor High School, Broadneck High School, Pocomoke High School and South River High School.

These young men and women have dedicated themselves to this project and, as the future leaders of their communities, it is their restoration plans that can serve as a model for the future.

In 1612, Captain John Smith looked upon the Chesapeake Bay and proclaimed that "heaven and earth never agreed better to frame a place for man's habitation." For those of us, who have the privilege of living along the Chesapeake Bay or one of its tributaries, we are proud that this majestic body of water is the largest estuary in North America. The watershed includes all or portions of 6 states; it holds more than 18 trillion gallons of water; it supports more than 3,600 species of plants and wildlife; and it produces some of the finest seafood in the world.

It is, therefore, not surprising that President Ronald Reagan once declared that: "The Chesapeake Bay is a national treasure that is worth preserving for its own sake". In recent years, this 15,000-year-old treasure has suffered from the effects of growing human population, over-harvesting of its resources, and water-quality degradation. While millions have been spent and restoration plans, like the Chesapeake 2000 Agreement, have been implemented, the job of restoring the Bay is far from completed.

In the final analysis, for us to reach our goal of restoring the Bay, it is essential to have local citizen involvement and that includes the students, and their parents, teachers, families, and friends, that are with us today. The shores of the Chesapeake Bay cradled our first settlements in America and together, with the vision of tomorrow's community leaders, we can restore this magnificent ecosystem.

Again, I want to welcome those who have traveled to our nation's capital to participate in this most important hearing. I am now pleased to recognize the gentleman from New Jersey, the Ranking Democratic Member of the Subcommittee, Congressman Frank Pallone.

Mr. GILCHREST. I want to yield now to the gentleman from New Jersey, Mr. Pallone.

STATEMENT OF THE HON. FRANK PALLONE, JR., A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW JERSEY

Mr. PALLONE. Thank you, Mr. Chairman.

I had a written statement, but I would like to submit that for the record, if I could.

I just wanted to say briefly that it is nice to see so many young people here today. As Congressman Gilchrest or the Chairman said, we get people from all over the world testifying before the committee, but we do not usually have as many younger people like yourself. It is kind of refreshing, frankly.

The other thing I was going to say is, whether you know it or not, Congressman Gilchrest is a great guy. He really is a true environmentalist. And as you can hear from what he has already said today, he is almost philosophical about the environment because he thinks it is so important to protect it. And he looks at things from the whole ecological perspective.

In addition to that, he is also very bipartisan. He neglected to mention that I am the Democrat. The Ranking Member is the most senior Democrat, if you will, on the committee. And he is always very gracious in having the Democrats not only have an opportunity to speak but also to bring up legislation that is important to them, which is the true test, I think, of being bipartisan.

The only other thing I wanted to mention is that, as Congressman Gilchrest mentioned, I am from New Jersey, but I also am from a district in New Jersey that is along the coast. My district is either along the Atlantic Ocean or along the Raritan Bay or

Raritan River or actually also the South River. I noticed some of you are from South River High School. I actually have a town called South River in my district that has a South River High School.

So we are very much similar in some ways to Congressman Gilchrest's area, because water, both the ocean and the rivers and the bays, are so important. We probably have a lot more pollution than you do, because New Jersey has so much more of a history of industrialization, so the pollution, in some sense, is even more of a problem. But in terms of our dependence on the water and our relationship to the water and the ocean, it is just as important, I think, as it is to all of you.

So I tell you that only because I want you to know that I can relate to your concerns.

In addition, I actually used to spend some time in the Annapolis area. My father-in-law, my in-laws, lived in Riva, which I guess is right across from Annapolis, so I used to go down there quite a bit. I notice that some of you are from Annapolis and nearby areas, so I am familiar with the area, too. Thank you. Thank you for doing this today.

[The prepared statement of Mr. Pallone follows:]

**Statement of The Honorable Frank Pallone, Jr., a Representative in
Congress from the State of New Jersey**

Thank you and good morning. For early Native Americans the Chesapeake Bay was known as "Great Shellfish Bay" for the Bay's natural abundance.

Later on, the famed Baltimore journalist and author H. L. Mencken described the Bay as a "great protein factory" because of the vast numbers of crabs, oysters, clams, and fin fish harvested.

History has shown that during the twentieth century, dramatic changes occurred on and around the Chesapeake Bay, often not for the benefit of the Bay itself.

Shores once covered with farms and seafood packing houses now sport sprawling subdivisions, traffic, golf courses and marinas which drain and funnel excessive nutrients into the Bay's ecosystem. Today, a visitor to the Bay is more likely to rub elbows alongside other vacationers and retirees than with a waterman plying for oysters.

This morning we will hear from several students who will report on how far the Bay has fallen from a condition of almost unlimited abundance and productivity. We also will learn about the challenges to restoring a healthy Chesapeake Bay.

Yet I view this hearing as a source of great optimism for the future. The Bay will only be restored if the next generation of residents rises to meet that challenge. I commend Chairman Gilchrest for giving these students that opportunity, and I look forward to hearing your recommendations. Thank you.

Mr. GILCHREST. Thank you, Congressman Pallone.

Mr. GILCHREST. Our first panel is made up of students from Broadneck High School and South River High in Edgewater. And from Broadneck High School, our two witnesses will be Christian Melendez and Jamie Morganstern. And from South River High, we have Olivia Logan and Bryan James. If you four would please come up to the table.

As you are coming up, as we go through, the first panel will give their testimony. And if you go over—if you see the light turn red and you are not done, just keep talking. It is OK. We do not cut you off at 5 minutes and 2 seconds.

When we begin the questioning, we would like to open it up for your other fellow students in the audience to answer if they would

like to. So we will start with Christian Melendez and Jamie Morganstern. You may begin.

STATEMENT OF CHRISTIAN MELENDEZ AND JAMIE MORGANSTERN, BROADNECK HIGH SCHOOL, ANNAPOLIS, MARYLAND

Mr. MORGANSTERN. Thank you, Mr. Chairman.

Thank you, congressmen, for having us here today. My name is Jamie Morganstern.

We are going to begin by looking at a couple of satellite images of where Broadneck High School is located. This first image is of Anne Arundel County. It is located in central Maryland on the Chesapeake Bay.

This next image is of the Broadneck peninsula, which is surrounded by two rivers that are tributaries to the Chesapeake Bay, the Severn River and the Magothy River.

The issues that we targeted during our research included air pollution, solid waste, toxins and oil, sediment, and nutrient loading.

Air pollution in Anne Arundel County is a large concern for much of the population. Through wetland, dry deposition, acid rain, and erosion and runoff, we receive much of the air pollution in the Chesapeake Bay. The air shed that is in the Chesapeake Bay is 6.5 times larger than that of the watershed, and it covers approximately 418,000 square miles from regions as far away as Canada and Kentucky.

The air deposition of the Chesapeake Bay contributes to approximately a third of the nitrogen load to the Chesapeake. And Anne Arundel County, where Broadneck High School is located, in the last State of the Air Report from the American Lung Association, dropped from 18th place to 17th place as the 17th worst county air quality in the country. Last year, we had 47 code orange days, which is a code for air quality that says that the air is bad for people with sensitive lungs, and 17 code red days, which is just bad quality for everyone.

Marylanders drive about 135 million miles a day, and 40 percent of Maryland air problems is from vehicle exhaust. Some solutions that we have thought up were things like car pooling to prevent this vehicle exhaust. Also, some kind of, maybe, tax-incentives to provide to these commuters. In Maryland, we have the commuter tax credit, which gives a tax credit to those who car pool. And we could also set new emissions standards and reduce polluting vehicles.

Solid waste is also a significant problem. This consists of municipal solid waste, which is generated by residents and businesses. The trash on the roadways can be washed into the Bay as well as dumping litter off of boats, which can destroy habitat and kill wildlife.

One specific example of Anne Arundel County's problem with the contamination is the 1983 incident with the Patapsco Aquifer, which runs below the landfill, one of the landfills which was closed in Anne Arundel County. And the water that ran below it leaked into the Furnace Creek and into the Bay and had several chemicals that were harmful.

Some solutions to the solid waste program could be better recycling programs, make them more successful. Although, we have had a lot of success with that. Also, waste facilities need to be properly managed. And a major problem that contributes to the solid waste is that 37 percent of all solid waste is paper. Thank you.

Mr. GILCHREST. Thank you very much, James. Very nice job.

Mr. MORGANSTERN. This is just a statistic that we found of 2001 total waste generation, and it just also shows that 36 percent of all solid waste is paper. And it breaks it down for the others.

Mr. GILCHREST. Why don't you read through those.

Mr. MORGANSTERN. OK. Paper, 35.7 percent; yard trimmings, 12.2 percent; food scraps, 11.4 percent; plastics, 11.1 percent; metals, 7.9 percent; rubber, leather, and textiles, 7.1 percent; glass, 5.5 percent; wood, 5.7 percent; and other, 3.4 percent.

Mr. GILCHREST. Thank you.

Mr. MELENDEZ. Thank you for having me here. I am going to go over toxins and oil right now.

As far as what humans do to contribute to the problem, we have leaking oil. A prime example is automobiles and boats that are not properly maintained by us. Obviously, the worst condition is the higher probability it is going to leak oil along with other toxins and coolants.

There is illegal disposal. This problem actually has been improving over the past few years, but we have had countries, especially Russia and the United States, illegally dumping oil and other toxins and hazardous waste off the coasts into the oceans. Then we have accidents. There is obviously the big one, the Exxon Valdez that we all know about.

Some solutions include recycling oil. That one is something actually that our county already promotes, but I think that we need to expand more upon it. Many people, I found, did not know that we have programs to recycle oil. I think about 42 gallons of oil, crude oil, is needed to refine 2 quarts of lubricating oil. But if we use 2 gallons, I believe, of recycled oil, that equals the same amount of lubricating oil that we can produce. So we would not need as much. And we would also be using what we already have produced.

Community action: We should just promote more awareness throughout the community and have people work more toward educating others about the problem at hand.

Next is sediment. Agriculture, development, and erosion all pretty much go together, hand-in-hand. Basically, through runoff, we have sediment moving into storm drains and other modes of transportation which ultimately lead into the Bay. Sediment basically reduces the clarity in the water and also smothers aquatic vegetation living at the bottom of the Bay. So this causes them to have a higher chance of dying, higher death rates.

Regulations: Basically to improve buffer zones is what we were aiming at for the sediment problem.

Here is a satellite image of the Chesapeake Bay watershed. It is not our tributary, but it is a good example of after a rain storm. We have the Potomac and Patuxant Rivers, and you can see much of the runoff that is coming off the coasts of these rivers, and ultimately, they will go into the Bay.

Our final problem is nutrient loading. Most of this comes out of nitrogen. We have an excessive amount of nitrogen in the Chesapeake Bay. It comes from fertilizer which runs off into the Bay. There are domestic pets in which their, basically, feces is hazardous to the Bay and will eventually make their way into the Bay. There is waste water discharge from the sewage treatment plants.

The biggest solution we thought would be more buffer zones. But a prime example would be, the Maryland legislature recently passed a flush tax, which is basically designed to bring in more revenue that would be used to upgrade the sewage treatment plants in the hope of reducing the amount of waste water that is discharged into the Bay.

And then our final few slides basically have to do with student activism. Things that the students in the community have done include organized tree planting. In the past 5 years, I believe that the Broadneck community has planted over 1,000 trees in the area. One of the big events was a 9-11 memorial. We dedicated around 100 or so trees to all of the countries of which people from those countries that died in the World Trade Center attacks. They each had their own tree to be commemorated.

There are environmental projects. The big one is Bay Day, in which students through the high school basically participate in all of these events that have to do with the Chesapeake Bay in order to promote awareness, education, and to educate basically on the significance of the Chesapeake Bay, to not only the watershed but to the rest of the country and the world and what they can do to preserve it and improve the situation.

These pictures basically give a look at the Broadneck peninsula, the students studying local streams. There have been some publications by the Broadneck students. As you can see, there was a Shoes, Ships, and Sealing Wax publication, which basically was an oral history of all of the local watermen and people associated with the Bay that basically gave their account of what the Bay meant to them, the significance they believe that the Bay played in their lives, and why we as a community should be concerned.

And then you can see students studying aquatic vegetation, bay grasses, which promote more oxygen in the Bay and increase water clarity. We have more students taking more of a hands-on approach.

Then, these are 2 articles. One is about Bay Day, and the other is about Broadneck students who visited Smith Island, which is an island located in the Chesapeake Bay. Basically, you can get a feel of what the community has been doing, mainly the students, of how to educate themselves better about the Chesapeake Bay. Thank you.

[The prepared statement of Mr. Melendez and Mr. Morganstern follows:]

**Statement of Christian Melendez and Jamie Morganstern on behalf of
Broadneck High School, Annapolis, Maryland**

CONTRIBUTORS TO THE REPORT:

Teachers:	Students
George Bell	Daniel Brittain
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	Geoff Gillikin

INTRODUCTION

Our high school and community are located on the Broadneck Peninsula in Anne Arundel County. We are situated on the western shore of the Chesapeake Bay near the Chesapeake Bay Bridge. The Broadneck peninsula watersheds into the Magothy, Severn and Little Magothy Rivers that empty into the Chesapeake Bay.

We have identified these problems in our community that potentially have a deleterious effect on the Bay:

- air pollution
- solid waste
- toxins and oil
- sediment
- nutrient loading

Human activities on the Broadneck Peninsula that are associated with these Bay problems include:

- development
- transportation
- habitat destruction

We have investigated some solutions that include

- green technology
- habitat restoration
- conservation
- education and awareness

Nutrient Loading

Each year roughly 300 million pounds of nitrogen overload the Chesapeake waterways.

1. A certain amount of nitrogen is healthy for the Chesapeake Bay: however, the nitrogen concentration in the Chesapeake Bay is six times the amount that is healthy for the Bay.
 - a. Most of the nitrogen comes from the nine major tributaries. 97% of the nitrogen entered the Bay through the James, Potomac and the Susquehanna rivers, the three largest tributaries. The Susquehanna contributes the most out of all of the Bay's tributaries, mostly because the river drains some of the most productive farmlands in the nation.
 - b. The effects are poor water quality caused by excessive algae growth, low dissolved oxygen (dead zones during summers result in fish kills), reduced water clarity (underwater grasses are deprived of light and die).
 - c. The causes and sources of the problem include, fertilizer in runoff from agriculture and lawns, wastewater discharge from sewage treatment plants, pet feces, boats that illegally dump sewage, and urban and suburban runoff from nonpoint sources.
 - d. Human activities that contribute to nutrient loading include development, lawn care, urban and suburban runoff, mismanagement of land, air pollution, fossil fuel emissions, poor soil conservation techniques in agriculture, wastewater discharge containing nitrogen from septic systems, and with increase in population sewage plants releasing untreated sewage.
 - e. Solutions include providing forest buffer zones along waterways, tree and native grasses planting that would prevent erosion, habitat restoration, and reduction of air pollution by carpooling and purchase of

more hybrid cars, solar power, energy conservation, and improved wastewater treatment. The proposed Flush Tax could be used to upgrade sewage plants.

Air pollution

Air pollution is more than just smog floating in the air. Through wet and dry deposition, the pollutants in the air fall to the ground and can eventually be carried into the Bay through erosion and runoff, becoming three problems, rather than just one.

Problems and sources:

1. The massive size of the Chesapeake Air Shed.
 - a. Compared to the watershed, the Air shed is six and a half times larger, having an approximate area of 418,000 sq. miles, being influenced by locations as far away as Canada, Kentucky, and South Carolina.
 - b. Air deposition contributes to about 1/3 of the total nitrogen load of the Chesapeake Bay (around 97.5 million pounds). It's estimated that 75 percent of the load will be distributed to the land, while the rest will flow directly into the water.
 - c. Nationwide, 474 counties are failing to meet standards for ground level ozone or for causing a downwind county to fail.
 - d. In the most recent "State of the Air" report released by the American Lung Association, Anne Arundel County fell from its 18th position to that of the 17th worst county in the nation.
2. Baltimore-Washington metropolitan area
 - a. Baltimore and Washington areas (Anne Arundel, Baltimore, Baltimore City, Carroll, Harford, Howard, Calvert, Charles, Frederick, Montgomery, and Prince Georges counties) have been deemed nonattainment by the EPA for failure to meet the federal standard for ground level ozone pollution.
 - b. Last year in Anne Arundel County, there were 47 Code Orange days (unhealthy air for sensitive groups) and 17 Code Red days (unhealthy air for everyone). That's 64 days with unhealthy air during the summer.
 - c. Marylanders drive more than 135 million miles each day. These miles are responsible for up to 40 percent of Maryland's air problems. The nitrogen from the exhaust will eventually find its way into the Bay, cause up to 40 million in crop damage, and cause many health problems to the citizens living in the area.
 - d. Anne Arundel County is no exception with many of its drivers commuting to the Washington and Baltimore area for work. Our county lacks a strong public transportation program.
3. Population of the water shed
 - a. There are nearly 16 million people living in the water shed today, by 2010, at least another 3 million people will be added. The Baltimore Washington Metropolitan Region is one of the fastest growing areas in the country. This means more vehicles and more demands for power. These two sources, vehicle exhaust and smoke stacks, contribute the most to nitrogen levels in the air.
 - b. Other sources include agriculture, which emits particulate matter, chemical compounds, and gasses such as ammonia.
 - c. These sources of pollution, stationary (factories), mobile (car), and agricultural cause acid rain, smog, and eutrophication.
 - d. Eutrophication creates dead zones, areas of water with out oxygen. Forty percent of the water in the Bay suffered from low dissolved oxygen levels. Accumulated nitrates can eventually creep into sources of drinking water.
 - e. In 2003, one of the largest dead zones ever recorded in the Bay's history was observed.

Solutions:

1. Offer more incentives towards alternative transportation to the work place. Through tax savings or allocated funds, employers/employees should be motivated to find different and more efficient methods to get to work. In Maryland there exists the Commuter Tax Credit, and since its introduction in 2000, more than 200 employers and 10,000 employees have joined.
2. Change patterns of land use to remove the component of driving to reduce emissions.

3. Push towards more environmental friendly methods of production of goods. Recently, there was the Clean Air Excellence Awards, which recognized 13 new, innovative environmental techniques.
4. Tax incentives may be a means of compensation for those who use environmentally friendly products, whether it is solar panels on the roof of one's house or purchase of a hydrogen car.
5. Follow in the footsteps of California and set a standard of 0 emissions to be reached by a certain year. An optimistic goal can stimulate greatness in results.

Toxins & Oil in the Chesapeake Bay

1. Oil released in the Chesapeake Bay Watershed can cause widespread contamination. The gradual breakdown of oil releases carcinogenic toxins into the Bay, harming marine life. One quart of oil can pollute up to two million gallons of drinking water. Four quarts of oil (the amount needed for a typical car) can create an oil slick as large as eight acres.
2. Some of the organisms at risk are:
 - a. Fish in the Bay will take oil into their gills.
 - b. Oysters, clams, submerged aquatic vegetation will suffer from reduced oxygen because of the layer of oil on the surface.
3. Human Activities that result in the release of oil include negligent dumping of motor oil into landfills, sewers/storm drains, and directly onto the ground. This can result in contamination of groundwater and much of the oil reaches the Chesapeake Bay.
4. Solutions include:
 - a. Recycling Oil because 42 gallons of crude oil is needed to refine two quarts of lubricating oil; only one gallon of recycled oil is needed to produce the same two quarts of lubricating oil.
 - b. Community action providing education for citizens through scheduled community meetings or signs on disposal of used oil.
 - c. Local, countywide, and/or statewide programs to collect recycled oil.
5. Support groups for implementation of the above solutions could include private organizations such as the Chesapeake Bay Foundation or county and state government.

Solid Waste

1. Solid waste includes municipal solid waste (generated by residents and businesses) and roadside litter. Trash is washed from roadways into waters that flow into the Chesapeake. Dumping litter overboard is illegal and can destroy habitat and kill wildlife.
 - a. Landfills, if not designed and operated properly, can result in ground water contamination from volatile organic compounds (VOCs), cyanide, and heavy metals including lead.
 - b. One such incident was the contamination of the Patapsco Aquifer (the most productive water source in the county). Such chemicals from the 80-acre Smuck dump contaminated it in 1983. Contamination was also found in sediments of Furnace Creek that borders the site and connects to the Chesapeake Bay.
 - c. To fight contamination, in 1997, the State amended the Consent Agreement requiring the County to cap the landfill with clean soil, install a landfill gas management system and a leachate collection system, collect sediment samples, and perform air monitoring.
2. Solutions include:
 - a. Increase of recycling programs. Paper contributes to 37 percent of all solid waste in landfills.
 - b. Toxic waste should be disposed of in appropriately designed facilities only (i.e., oil).

Sediments

1. Sources
 - a. Sediments are the loose particles of soil, clay, and other substances that are suspended in the water.
 - b. The main sources of sediments are agriculture, high way construction, building sites, forest clearing, and shoreline erosion. The sediments from these sites may contain nutrients, oils, pesticides, and other pollutants.
2. Problems
 - a. Suspended sediment clouds the water that reduces access of underwater vegetation to sunlight inhibiting growth. Loss of growth reduces

- dissolved oxygen levels and depletes habitat for other organisms such as crabs and fish.
- b. Sediments smother bottom dwelling plants and animals (i.e., SAV, oysters, and clams).
 - c. Loose sediments fill in ports and waterways, and block the passages of streams.
3. Solutions
- a. Planting and protection of shoreline vegetation. Stricter regulations can help in creating stronger buffer zones composed of cord grass, phragmites, and stream bank fencing to keep domestic animals from eroding shorelines.
 - b. Planting of underwater grasses to help trap sediment and reduce wave action that causes shoreline erosion. Broadneck High School participates in “Grasses for Classes,” a project in which students grow grasses in their classrooms and plant them in their bay.
 - c. Storm water management plans include rain barrels and rain gardens.
 - d. Reducing the amount of impervious surfaces (i.e., turf roofs).

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Bay Related Activities at Broadneck High School:

- Broadneck High School was selected as a Bay School by the Chesapeake Bay Foundation and was a part of the Bay School Project from 2000—2003. The purpose of the program was to utilize the Chesapeake Bay as an integrating context to deliver curriculum. This project was based on studies indicating that when the environment is used as an integrating context, scores on standardized tests improve, disciplinary referrals decrease, and a heightened sense of community develops in the school. We continue to work with the Chesapeake Bay Foundation through their Chesapeake Classrooms program.
- Bay Days occur each fall during which the entire freshman class participates in interdisciplinary Chesapeake Bay related activities including a service-learning project.
- Students in a number of science and social studies classrooms are growing and studying underwater Bay grasses. In June the students will plant the grasses in local waterways. This is the 3rd year we have participated in this program.
- Over the last 5 years Broadneck students have planted over 1,000 trees on our campus. The year following 9-11 we planted 83 commemorative trees in memory of all countries that lost citizens that day. This year we planted 30 trees at Sandy Point State Park. The source of funding for these plantings came from grants from the Chesapeake Bay Trust and the State Department of Natural Resources.
- This spring the Outdoor Science Club led by an Eagle Scout applicant will install rain barrels on the campus field house and will plant native plants in a memorial garden to be watered by the rainwater collected in the barrels.
- Several school clubs are dedicated to environmental improvement. These clubs are Recycling Club, the Outdoor Science Club, and the Broadneck Beautification Club.
- Three years ago Broadneck speech students collected oral histories from watermen and others who are intimately connected with the Bay and published a book entitled, Shoes, Ships, and Sealing Wax. This book heightened awareness in our community of the importance of the Bay and its plight.
- English students continue to write children’s books that are Bay related and to share them with local elementary students.
- Advanced Placement Environmental Science (a college level course) enrollment has grown to 150 students for the 2004—05 school year and 50 students have enrolled in environmental science (a high school level course).
- Students plan to share this report with the county council, the Chesapeake Bay Foundation, the Magothy River Association, and the Severn River Association.

Mr. GILCREST. Very well done.

We are joined by Congressman Ron Kind from Wisconsin.

Ron, thanks for coming. Did you want to make a statement?

Mr. KIND. I would be happy to. I thank my good friend and colleague from Maryland for hosting this hearing.

And I wanted to especially welcome the high school students in attendance today and hearing your testimony. I am very excited to see, Mr. Gilcrest, this panel of high school students and others in attendance showing some interest in what I think and what I believe you think is one of the great challenges we face in this Nation. And that is habitat protection, quality water supplies, what we can do, working together at all levels, from the Federal Government, State, local, and private entities and individual citizens like yourselves to improve the environment in which we live and in which we grow up in.

Just to make the connection, as far as the Chesapeake Bay area and in the western part of Wisconsin, the district that I represent—I am right along the Mississippi River, and it is one of North America's largest migratory routes. Every fall, we have a large population of tundra swans that are flying down from Canada, flights in western Wisconsin in some of our back bays and wetlands areas as they continue their trip to the Chesapeake Bay area. So even though you may think the Chesapeake is a relatively distinct geographic area, it has a huge impact on all of us in North America and my constituents, too, in western Wisconsin.

So I am glad to see this interest at this level. We have some high school students and middle school students in western Wisconsin who also have these days-on-the-river type of excursions and field trips where they work with some of the scientists at the USGS Upper Mississippi Science Lab. And they do all kinds of student projects too. So it is really good to see the youth of our country getting involved in such an important issue that we are going to be dealing with for many decades to come in this century.

So I welcome you all, and I thank my good friend for holding this hearing today. Thank you very much.

Mr. GILCREST. Thank you, Mr. Kind.

Chris and Jamie, you did a magnificent job.

We will go to Olivia and Bryan for the next two. Is Bryan or Olivia going to go first?

**STATEMENT OF OLIVIA LOGAN AND BRYAN JAMES,
SOUTH RIVER HIGH SCHOOL, EDGEWATER, MARYLAND**

Mr. JAMES. I will.

First, I would like to say, thank you very much, Mr. Chairman and Congressmen, for having us here today. We are from South River High School, which is located in Edgewater, Maryland.

Mainly what we focused on were the tributaries around us. We focused on the Rhode River, the Severn River and the South River, which is where we are from. A lot of the problems facing us, a lot of the things are centralized in our area and have a huge impact. And it has been in the papers and everything. Lots of stuff going on, so that is mainly what we focused on in our presentation.

Ms. LOGAN. We focused on three different problems. We focused on boating, erosion, and nutrients.

First, about boating, we discovered that maintaining and operating a boat, its engine, and the marine sanitation devices on board are factors that can have severe negative impacts on water quality, shoreline stability, and bay life. Marine sanitation devices, which are the heads/toilets on board, they contain human waste which contains nitrogen and phosphates that contribute to water pollution, such as algal blooms and oxygen depletion.

Other problems associated with boats is littering and the dumping of any material in any inland watery, such as rivers, lakes, bays, and sounds, which is actually illegal, but that does not necessarily stop people from doing it.

Boat wakes also contribute to shoreline erosion, especially in smaller coves and creeks. And wakes tend to stir up bottom sediments which reduces sunlight essential to underwater grasses.

Regarding appearance and maintenance of one's boat, a single quart of spilled oil can pollute up to 2 acres, which is the equivalent to nearly 3 football fields of water surface.

Regarding nutrient pollution, due to pollution from excess nitrogen and phosphorus, the Chesapeake Bay remains on the Clean Water Act list of impaired waters. Currently, waste water treatment plants contribute 61 million pounds of nitrogen per year. Nitrogen pollution causes algae blooms that consume oxygen which lowers dissolved oxygen levels so that fish and shellfish die. Overabundance of nitrogen contributes to the Bay's dead zone and creates algae blooms that block sunlight to underwater grasses and prevents their growth.

The majority of nitrogen pollution comes from human impacts, such as sewage treatment plants, large-scale animal operations, agriculture, air pollution, and smokestacks.

Erosion is a problem on the Chesapeake Bay because of, like I said before, the boat wakes. During periods of rain or melting snow, soil and other particles are carried off the land and into the waterways. Sediments make the water cloudy so less light is available for underwater bay grasses to grow and then support the water life that are surrounding it. Also, sediments can carry high concentrations of certain toxic materials that contaminate waterways.

We discovered that a way to deal with erosion is to do different landscaping. And we discovered that you can cover the soil by choosing grasses, perennials, shrubs and trees that fit your landscape. You can use mulch and straw to cover the soil, or you can direct downspouts on to grass or mulched planting beds using splash boxes to reduce impact.

You can also improve the soil by adding organic matter or using compost yard waste and using planting beds as a place to recycle fallen leaves. You also can stabilize slopes and gardening on slopes by using native grasses, ground covers or shrubs, rather than using grass clippings, as mulch. A way to implement such a plan would be to use local business support or have local lawn services offer a discount on the landscaping.

Also, landscapes that help the Chesapeake Bay are things like having paved areas at a minimum or rethinking your lawn, such as considering making it smaller or planting wild flowers. Another idea is to leave buffer strips which are 25 foot wider strips of

unmowed grass or woodland along the water. And a way to implement this plan would be to have a tax conventional insecticide, herbicide plan or have a public works group construct drains leading to the ground in hard surfaces or remove hard surfaces entirely.

Mr. JAMES. Landscapes that help the Chesapeake Bay: Keeping paved areas to a minimum. That way, when the construction is going on to pave the areas, it really degrades the sediment and the structure of the sediment so much that it makes it much easier for runoff to happen. Like she said, buffer strips and dealing with a lot of pests sensibly. We have all kinds of pests affecting the lawns.

Boating erosion solutions: Boating is a huge problem. It is causing most of the erosion along the Bay. The South River just recently in the past few years implemented a 35-mile-per-hour speed limit on the river. That way, it keeps it down. I know for a fact that Turkey Point Beach has lost over 20 feet in the past 10 years due to boating erosion from the wakes. It has been put on one of the critical beach lists, Turkey Point Beach and Turkey Point Island.

Another thing, disallowing boats with horsepower over 7 miles an hour in narrow waterways, or keep a uniform speed limit. Deep Creek Lake has the same model. And what that keeps it from is those really narrow waterways from just pretty much sinking right into the water. Since I have lived there, I have seen a few islands turn into just about shrubs now sitting out in the water.

Uniform bulkhead along the shorelines. Most houses do have bulkheads to keep their property from fading away, but a lot of them do not. A uniform bulkhead policy would be the best thing to do, because the soil running off is a huge problem.

Of course, the easiest part, funding, coming up with the money for it. Possible solutions would be charitable donations. You could run dinners sponsored by the local businesses, things like that. You can also do tax implementation. What we can do with that is put a State tax on fertilizer, and you can discourage overuse for commercial companies, government-approved fertilizer, things like that. Local agriculture businesses can be charged with taxes that support their preservation causes, and also waterway fund tax writeoff. You can include a form to contribute to problems of erosion, and that way, you can write it off on your taxes.

Private fees: We really need to raise the fees for dealing with the Bay, because a lot of the penalties are not strong enough right now. And I feel that DNR, they try their best, but they are really understaffed. And they cannot keep a really good handle on it. So a tax deduction for ecological improvements or donations from individuals is another good thing.

So this is just basically an overview of what we were talking about, penny drives, holding dinners supported by local businesses. It is just an overview. Thank you very much.

Ms. LOGAN. Thank you.

[The prepared statement of Ms. Logan and Mr. James follows.]

**Statement submitted by South River High School,
Edgewater, Maryland**

BOATING, EROSION, AND NUTRIENTS: PROBLEMS AND SOLUTIONS FOR THE SOUTH RIVER, RHODE RIVER, AND SEVERN RIVER TRIBUTARIES OF THE CHESAPEAKE BAY

WRITTEN BY:

BRYAN JAMES
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I. Tributaries In Consideration

- A. Rhode River
- B. Severn River
- C. South River

II. Boating

- A. Background Information
 - 1. The effects of a single boat may seem insignificant, but when multiplied by the tens of thousands, the effects are dramatic.
 - 2. Maintaining/operating a boat, its engine, and marine sanitation devices are factors that can have severe negative impacts on water quality, shoreline stability, and Bay life.
- B. Marine Sanitation Devices (MSD's)
 - 1. Human waste contains nitrogen and phosphates that contribute to water pollution, such as algal blooms and oxygen depletion.
 - 2. Human waste contains bacteria that can transmit diseases to swimmers and can close shellfish beds.
 - 3. Preventable problems
 - a. sewage discharge.
 - b. failure to meet EPA standards (heads/toilets).
 - c. Lack of on-shore pump-out stations.
 - d. Failure to maintain/rinse the MSD.
- C. Littering
 - 1. Plastic and litter ruin the natural beauty of the Bay and injure/kill aquatic life.
 - 2. The dumping of any material in any in-land waterway (rivers, lakes, bays, and sounds) is illegal.
 - 3. Plastics are prohibited from being thrown overboard worldwide.
 - 4. Preventable problems include illegal dumping of wastes.
- D. Boat Wakes
 - 1. Wakes contribute to shoreline erosion, especially in smaller coves and creeks.
 - 2. Wakes stir up bottom sediments, which reduces sunlight essential to underwater grasses.
 - 3. Preventable problems include violators of speed limit.
- E. Boat Appearance and Maintenance
 - 1. Scrapings from sanding/scraping are hazardous waste.
 - 2. Due to its toxicity, it is illegal to use an anti-fouling coating on your boat to prevent growth on the bottom.
 - 3. A single quart of spilled oil can pollute up to two acres, the equivalent to nearly three football fields of water surface.
 - 4. The alcohol content of unleaded fuels has a tendency to deteriorate fuel line hoses.
 - 5. It is illegal to dump antifreeze into the Bay and its tributaries.
 - 6. Oil in bilge water can be pumped overboard by the bilge pump.
 - 7. Preventable problems:
 - a. Failure to report oil spills or toxic products spills in general
 - b. Using toxic boat cleaners

III. Nutrient Pollution

- A. Wastewater Treatment Plants
 - 1. Maryland has 62 major wastewater treatment plants.

2. Due to pollution from excess nitrogen and phosphorus, the Chesapeake Bay remains on the Clean Water Act list of impaired waters.
 3. The Chesapeake 2000 Agreement, signed by Maryland, Virginia, the District of Columbia and the Environmental Protection Agency, commits to taking actions necessary to removing the Bay and its tidal tributaries from the list by 2010.
 4. Currently, wastewater treatment plants contribute 61 million pounds of nitrogen per year.
 5. Upgrading the major wastewater treatment plants to achieve nitrogen reductions of 3 mg/liter would remove 42 million pounds of nitrogen in the Bay each year or 31 percent of total nitrogen reductions needed to meet 2010 goals.
 6. To meet 2010 goals, annual nitrogen discharges into the Bay must be reduced by at least 150 million pounds from the current 300 million pounds.
- B. Nitrogen and Phosphorus
1. Nitrogen pollution causes algae blooms that consume oxygen, which lowers dissolved oxygen levels so that fish and shellfish die.
 2. Overabundance of nitrogen contributes to the Bay's "Dead Zone" and creates algae blooms that block sunlight to underwater grasses and prevents their growth.
 3. As land use patterns change and the watershed's population grows, the amount of nitrogen entering the Bay's waters increases tremendously.
 4. The majority of nitrogen pollution comes from human impacts such as sewage treatment plants, large-scale animal operations, agriculture, air pollution, and smoke stacks.
 5. Agricultural runoff contributes 40% of the nitrogen and 50% of the phosphorus entering the Bay.
 6. Nutrients come from natural sources such as decaying organic matter in forests and wetlands.
 7. Other sources include septic systems, runoff from roadways, development, residential and commercial lawn fertilizers, and air deposition from factories.
 8. Too many nutrients pose the threat of *Pfiesteria piscicida*, a microscopic organism that has been linked to people having difficulties learning and concentrating.

IV. Erosion

- A. During periods of rain or melting snow, soil and other particles are carried off the land and into waterways.
- B. Sediments can smother bottom-dwelling plants and animals, such as oysters and clams.
- C. Suspended sediments make the water cloudy so less light is available for underwater Bay grasses.
- D. Sediments can carry high concentrations of certain toxic materials that contaminate waterways.
- E. Sediments also carry nutrients, particularly phosphorus, which increases nutrient pollution in the Bay.
- F. Other natural processes that contribute to sediments in the Bay are wind, ice-flows and water currents.
- G. Sediments are loose particles of clay, silt, sand and other substances that are suspended in the water and settle to the bottom of a water body.

V. Landscaping to Deal With Erosion:

- A. Cover the soil
 1. Choose grasses, perennials, shrubs, and trees that fit your landscape.
 2. Use mulch and straw to cover the soil.
 3. Direct downspouts onto grass or mulched planting beds (use splash blocks to reduce impact).
- B. Improve the soil
 1. Add organic matter.
 2. Compost yard wastes and use planting beds as a place to recycle fallen leaves.
 3. Use raised beds with framed solid sides (will keep soil in place).
 4. Plant cover crops in the garden (a.k.a. green manures).
- C. Stabilizing slopes and gardening on slopes

1. Use native grasses, groundcovers, or shrubs (do not use grass clippings as mulch).
2. Plant along the contour.
3. Construct terraces.

D. Implementation

1. Local business support. Selected lawn suppliers will offer discount prices on mulch, grasses, and shrubs.
2. Local lawn services will offer a discount on landscaping. The citizen may landscape his own yard if he/she prefers.

VI. Landscapes That Help the Chesapeake Bay: The following landscaping recommendations will be beneficial to the environment around the Chesapeake Bay.

A. Keep paved areas to a minimum

1. Hard surfaces do not allow water to soak into the ground.
2. Instead use gravel, wood chips, stepping stones, or bricks on sand.

B. Rethink the lawn

1. Consider making it smaller.
2. Plant wildflowers.

C. Conserve water

1. Use plants adapted to this region.
2. Use plants that are extremely drought tolerant.
3. Group plants that require regular watering to minimize waste.
4. Use soaker hoses or drip-irrigation.
5. Water lawn only when grass shows signs of needing water.

D. Leave buffer strips

1. 25-foot wider strip of unmowed grass or woodland along the water.
2. Will slow runoff, filter water pollutants, and provide food and shelter for wildlife.

E. Deal with pests sensibly

1. Integrated Pest Management (IPM).
2. Plant a variety of species to avoid widespread damage.
3. Use disease and insect-resistant plants.
4. Monitor your landscape.

F. Conserve energy

1. Leave trees standing around building.
2. This will reduce energy consumed by heating and air conditioning units.

G. Implementation

1. Tax conventional insecticides/herbicides.
2. A Public works group should construct drains leading to the ground in hard surfaces, or remove hard surface entirely.
3. See Section V for landscaping plan.

VII. Solutions to Prevent Erosion From Boating

A. Implementation—develop a uniform rip rap and bulkhead policy along protected shorelines.

1. This has proven to reduce erosion by more than 80% in some areas.
2. The cost of this implementation is considerably small when you consider how expensive it will be 20 years from now to recover.
3. Bulkheads not only prevent erosion but also protect all wildlife that exists around it and helps prevent flooding.

B. Reduce speed rates on the rivers in all areas as they have done on the South River

1. Since the speed limit has been reduced to 35 mph, Turkey Point Beach has been taken off the Critical Beach list for the Chesapeake Bay.
2. If all areas where residential housing has already made to sediment subject to erosion had the speed limit reduced, similar success could be expected.

C. Do not allow boats with a horsepower of over 7 mph in some narrow coves and stream since these places are much more susceptible to erosion.

1. This plan has been put into place in areas such as Deep Creek Lake with great success.
2. This also prevents boaters from running their vessels aground because of the legal ramifications that will be put into place
3. Boat wakes contribute to shoreline erosion, especially in smaller coves and creeks. Stir up bottom sediments, which reduces sunlight essential to underwater grasses.

VIII. Nutrient runoff

- A. The problems of nutrient runoff can be solved by
 - 1. Sparing use of fertilizer or use of fertilizer alternatives encouraged by federally supported regional government taxes.
 - 2. Set yearly goals for reducing nutrient runoff in industry. Upgrade wastewater treatment facilities and tax facilities that do not meet industry goals by the quantity over the goal.
 - 3. Teaching practices that prevent erosion and runoff, and assistance from public works/municipalities/local businesses to implement them.
- B. Fertilizer Use and Alternatives—Educate persons about alternatives and about proper, effective fertilizer uses, and put a heavy tax on fertilizer.
 - 1. Education for the proper use
 - a. Use fertilizer from September to November.
 - i. This allows grass to recover from summer stresses.
 - ii. It also may reduce the amount of runoff.
 - iii. Maximizes nitrogen uptake.
 - b. Keep fertilizer off of pavement.
 - c. Use a drop spreader in restricted spaces.
 - d. Fix your spreader to prevent over-application.
 - e. Avoid Natural drainage areas.
 - f. Do not use on dormant or icy lawns.
 - g. See attached sheet for proper amount. Try to keep in minimum.
 - h. Water only when absolutely necessary.
 - i. Maximum amount of fertilizer for each lawn should not exceed two pounds for any lawn.
 - 2. The tax on fertilizer should encourage new alternatives.
 - a. Corn Gluten—not harmful—biodegrades to a natural nitrogen fertilizer.
 - b. Compost pile—use organic soil parts such as peat moss, bone/blood/horn/hooft meal, fish, manure. Biodegrades into soil nutrients.
 - c. Milorganite—Frederick County uses this organic fertilizer as a substitute.
- C. Implementation of Proper Land
 - 1. Farmers and civilians will be required to administer a soil quality test and make evaluations of a their lawn.
 - 2. They will then report their results to the state government, and then determine what materials are needed to make the resident more environmentally safe. These materials will be offered to the resident at a reduced price. Some changes:
 - a. Topsoil must be covered with shrubs, grasses, etc to keep runoff to a minimum.
 - b. Mulching is an effective way to reduce topsoil runoff.
 - c. Garden on level ground. If you must garden on a hill, reduce runoff by creating terraces.
 - d. Public Works programs could assist in building upon request.
 - e. Shrubs and other grasses also reduce erosion and runoff (See sections V and VI).
 - 3. Citizens who fail to send in results or reform their lawn will be punished with a fine.

IX. Solutions to Prevent Pollution From Boating on the Chesapeake

- A. Government public works will inspect marine gas stations to encourage improvement of conditions.
 - 1. Too many marinas in and around our area do not practice safe policies when pumping gas.
 - 2. Over the past year the DNR has issued over 120 citations to marinas for thing, such as gas spillage and improper disposal of toxic chemicals.
 - 3. These facts should also be made more accessible to the public to create a pressure on the marinas.
- B. Crack down harder on shipping freights that are on their way into the Inner Harbor
 - 1. Often times these ships pump bilge and release their waste tanks into the Bay, which in turn drifts into our rivers and does considerable damage.
 - 2. If we make pump stations for this waste more accessible then maybe these ships would be encouraged to dispose of their waste properly.

X. Funding

- A. Charitable Donations—Post donation tabs at local businesses that will call on residents to donate
 - 1. Hold charitable dinners with goods donated by local businesses.
 - 2. Hold penny drives during environmental education weeks in schools.
- B. Taxes
 - 1. A state tax on fertilizer to provide funds and discourage overuse.
 - 2. Local at risk businesses can be charged with taxes that support preservation causes
 - 3. Companies requesting construction in at risk areas would be charged a fee to protect those areas
 - 4. Waterway Fund Tax check off
- C. Private Fees
 - 1. Individuals that participate in hazardous activities toward the waterways could be charged addition fees.
 - 2. Design and market license plates and other commodities.
 - 3. Tax deduction for ecological improvements or donations from individuals.

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Mr. GILCHREST. Bryan and Olivia, excellent, excellent job.

I have a few questions that I can ask the witnesses, but if there is anyone from your school who wants to participate in that answer, you are welcome to do that.

I want to tell all of you that I do not know how many of you are seniors, who will be graduating and moving on to college, but we are going to make an annual event out of this.

To the schoolteachers, we will let you know sometime in September instead of February, and we would like to do it maybe sometime in April to give you a longer time to get prepared for it, although I do not know if you could do a better job than what we have seen here this morning.

But we really want to tap into your enthusiasm and passion for this issue on an ongoing basis, not for the purpose of this one particular hearing. But we would like to help you get organized and pursue the dissemination of this kind of information to many other key people around, basically around the watershed.

That is why I am glad that—Mr. Pallone had to go to the Floor, but he will be coming back, and I am glad that Mr. Kind was able to join us here this morning.

Some questions first to, I guess to Christian and Jamie. Do you have any idea of the condition of the Patapsco Aquifer contamination that you mentioned, where that is right now?

Mr. MORGANSTERN. I do not have any specific details, no.

Mr. GILCHREST. Maybe we can look into that for you and pass that along to you and see what the status of that is. But that was an excellent statement that you made in that area, so that gives us a little information that we really did not have before to make a concerted effort.

Mr. MORGANSTERN. I do know that the landfill that was on top of that has been shut down since then.

Mr. GILCHREST. OK. Well, it would be good to find out if it is still leaching into the aquifer and certainly let the people of the community know.

You mentioned the Grasses For Classes program in your school. Can you give us some more detail on that? Grasses for Classes, I like that.

Mr. MECKIC. My name is Dennis Meckic from Broadneck High School. I can give you some information about that.

Mr. GILCHREST. And you are a teacher?

Mr. MECKIC. Yes. We have a project in the school where we have teachers growing the grasses in the classroom for a period of about 9 weeks. And we have a respiration site in our community on the Little Magothy where we are trying to restore bay grasses at that site. And that is an ongoing project from last year and this year and hopefully into the future.

We also have students who are growing bay grasses at their homes that will also be planted at that site, and that will happen the first week of June.

Mr. GILCHREST. That is fabulous. That is wonderful. You also mentioned the storm water management as being a problem, and that is clearly an issue all over the State. But you said something about rain barrel and rain garden. Could you tell us a little bit more about that, how that works?

Mr. MORGANSTERN. Basically what a rain barrel and a rain garden does is it collects water that runs off of a building, perhaps a house or, as we are planning to do at our school, running off the field house from the football field, and having a rain garden that distributes the water that we collect to a garden through barrels.

Mr. GILCHREST. So you have that set up now?

Mr. MORGANSTERN. Not yet.

Mr. GILCHREST. I see.

Mr. MORGANSTERN. We have the materials. We need to put it together, though.

Mr. GILCHREST. At the field house?

Mr. MORGANSTERN. Correct.

Mr. GILCHREST. That would be great. I think that would be a really fabulous example, not only for the school but for the community. Just those little pieces of recognition of the problems that can be resolved with simple individual solutions. And I think people want to help the Bay clean-up; they just do not know how. You are going to go a long way in showing them how.

The key to some of the things that you have recommended have been education. I think the classes that we see here today have been engrossed in understanding the issues in their part of the Chesapeake Bay. So the kind of information that you have gathered here with your school and with the curriculum is extraordinary, something that I think would benefit all of the schools in the Chesapeake Bay watershed.

Can you give me your opinion on the schools in the Chesapeake Bay watershed tapping into the Bay program to actually create a curriculum?

I am not trying to tell you how to run your school. I actually voted against No Child Left Behind, the Federal bill, better on the local level, and I did not like MSPAP. I was not a teacher during that period of time, but I did teach in Kent County High School, and my classroom was my creative arena. I think that has been reduced to some extent now.

But we learn how to read, write, and do arithmetic. And those things are standard in all schools. And they help you for decades and decades. That is the structure of how you go about your day-to-day life in this civilization: reading, writing—well, maybe people do not write any more with computers, but reading, writing, and arithmetic.

I think a part of that, and I want to get your comments on this, would be the biosphere, just to know about the place where you live called planet earth and what it takes on the planet in a natural way to keep the biosphere alive.

So could you see some day in your school system having an ecological study similar to reading and writing from K through 12?

Mr. MELENDEZ. You mean more of as a program, like maybe developing a new class that would be incorporated into the county curriculum that has to do with, like, the local watershed?

Mr. GILCHREST. I think so. I am sort of asking you the question to see if I can fine-tune my proposal, but something like that.

Mr. MELENDEZ. Well, something like that we somewhat do have. We have a class called environmental science, which basically deals with that, but it is more of an entire planet earth kind of thing. I think if we could make it more limited, more narrow in the field that it covers, more as the Chesapeake Bay watershed, maybe if we could develop a class that could be a supplement.

Mr. GILCHREST. Sure.

Mr. MELENDEZ. To environmental science, or it could just be separate on its own, but something that all of the students could take to further their understanding of the environment.

Because environmental science deals with a number of topics which all have to do with the Chesapeake Bay watershed, but I think the watershed has its own problems as opposed to maybe other areas of the world. So if we could get a more in-depth look

at the Bay, not through a program such as Bay Day, which is good, but that is more of a one-time, annual thing.

I think, if we could have something throughout the entire school where kids constantly, every day, would be learning about and then there would be projects associated with that throughout the year.

Mr. GILCHREST. That sounds right on the mark.

Ms. NIEDHARDT. I am Pat Niedhardt from Broadneck High School. The Chesapeake Bay Foundation has had a marvelous program over the last few years called the Chesapeake Bay Project. Broadneck High School was one of 9 schools that was participating in that. And the idea behind this was to have the environment, the Bay, be an integrating context for delivering our curriculum. So not adding on to our curriculum—as you know, that is always a problem—but using this as a way to deliver our curriculum.

So the book that you saw up there, one of our speech teachers had always had her students do oral histories. And often students had interviewed their grandparents, which is great. But she had them interview watermen. And they went out on to Smith Island, and they spoke to the local watermen, et cetera.

So the whole idea behind this, and there have been national studies on this, when you use the environment as an integrating context and you give students the opportunity to have real experiences, like you are providing them with today, this makes a huge impact on their life. Not only does it do that, but their grades are better, there are less disciplinary referrals, and everyone learns more.

Mr. GILCHREST. Well, thank you very much.

I have some other questions for South River High School, but I will yield now to my colleagues. We are now joined—and I have to ask unanimous consent for Mr. Cardin to sit on the dais.

Mr. Cardin is on a number of committees here in Washington, but he is not on this committee, but I want to thank him for coming and sitting with us this morning.

Thanks for coming, Ben. I appreciate it. Ben represents, Congressman Cardin represents much of Anne Arundel County, including Annapolis, which actually covers both the watersheds of the two high schools that are here. So Ben will have some questions.

Do you want to have a quick statement, Ben, before I yield to the other colleagues?

STATEMENT OF THE HON. BENJAMIN L. CARDIN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MARYLAND

Mr. CARDIN. Let me thank Chairman Gilchrest for inviting me to attend. I really wanted to thank the students for being here and participating in our hearing.

Mr. Chairman, we have spent in Congress a great deal of energy on the Chesapeake Bay and the role the Federal Government plays in it. It has been now 25 years in which we have been paying attention to the Chesapeake Bay. It is one of the most interesting bodies of water in the world and one of the efforts that have been made that really paid off.

The frustrating part is that we have done a lot of work with Government, with the private sector, with different States, and we have done miraculous things in improving the quality of the water of the Chesapeake Bay. That is the good news. The bad news is that we have a long way to go. There is still a lot more work to be done. It is really going to be up to the next generation, your generation, leadership in your generation, whether you will be able to continue the interest in preserving and protecting the Chesapeake Bay and other bodies of water around our Nation. Whether the tradeoffs will be development or the tradeoffs will be cost, whether you will make this a priority in your generation.

I had the chance, I guess a week ago, to be with Germantown Elementary students in Annapolis as we did a wade-in at the Bay and discovered some of the wildlife and some of the pollution problems. And we really have a real responsibility to continue this effort, which is going to cost resources, money, as well as attention. It really is your generation who I hope will provide leadership in the future.

So, Mr. Chairman, I am pleased to be here. I want to make it clear that we want the Federal Government to be a partner, but a partner with the private community, with our schools, with our local communities.

There have been a lot of programs that you, Mr. Chairman, have been very instrumental in helping create and fund, to provide a very small amount of Federal funds that leverage local activities, including by our students, that have tremendous impacts on the future of the Bay. And it is these types of programs that I think will pay off the biggest dividends in the future.

Mr. GILCHREST. Thank you, Mr. Cardin.

I yield now to the gentleman from New Jersey, Mr. Pallone, for any questions he may have.

Mr. PALLONE. Well, I just want to apologize. I had to leave after making my opening statement to go down to the Floor and make a speech, but I know, generally, what you are talking about. And I have read some of the testimony.

If you remember, earlier, I mentioned about my own district in New Jersey. If I could just make some analogies and then maybe ask one question.

Where I live in New Jersey, we are along the Atlantic Ocean, but then we also go into the Raritan Bay and into the rivers, the Raritan River, the Shrewsbury and the Navisink Rivers, so there are some similarities. As I mentioned, we have a long history of industrial pollution, which is far greater, I think, than what you face in the Chesapeake.

What we did is—I have been around for 16 years—and for the first 10 years or so that I was here, we tried to stop all of the point source pollution, because people used to dump off the coast of my district sewage sludge, toxic dredge materials, everything, acid waste, the whole thing, and that was a big source of the contamination. We gradually closed, through Federal action and State action, every one of those point sources.

But now the big problem is of course non-point-source pollution, and this Subcommittee and of course our Chairman, Congressman

Gilchrest, has spent a lot of time having various hearings that relate to non-point pollution.

The problem we have, and I know that Congressman Cardin was alluding to this, in as much as we have made great progress in cleaning up the water from the point sources, because there is so much more development, even in a State like New Jersey that is so over developed already, there has been so much more development in the last 10 years or 15 years since I have been in office that we are still not keeping up with it. In other words, we have all this pollution that comes from runoff, from lawns and you name it, whether it is commercial, industrial, or residential, that continues to cause problems.

So I really think that the future is dealing with the non-point source pollution, and a lot of it has to do with smart growth and being able to make sure that development does not impact the coastal areas as much as possible. That is not an easy task, though, because as you know, there is a constant pressure to build more and to have more high density development.

So I do not know if any of you wanted to comment on that, whether or not—I know the Chesapeake is facing this same problem and whether you see, maybe amongst younger people like yourself, an understanding of the fact that we just maybe cannot have as much growth, we have to slow the growth, if anybody wanted to comment on that.

Mr. JAMES. Yes, I agree with that. I do not think people really see the tradeoffs, the benefits of that that you are making. Right now, you cannot put certain kinds of fertilizer in your yard. You have to put a certain kind of bulkhead up. And they say, "It is going to make my yard look bad, but in the future, I will have a yard in 10 years or 15 years if I put this up." I just do not think that people really see the benefits of doing things now. I think they are kind of set in their ways, and I think that is the main problem.

Mr. PALLONE. Thanks.

Anybody else?

I find that younger people like my own children tend to be a lot more conscious of these things, but it is still hard to relate it down on an individual level. I agree with you.

Thanks, Mr. Chairman.

Mr. GILCHREST. Another responder in the back.

Mr. WHITMAN. My name is Leif Whitman.

Mr. GILCHREST. You are from which high school?

Mr. WHITMAN. Broadneck High School.

I think it is maybe not even so much as stopping the growth, which is something that is pretty unrealistic, because that would of course be a much larger contribution from, like, the Governments and more control. But maybe just encouraging and enforcing smarter growth. All across, like, the known world and everything, it is just Americans seem to have a very strong sense of wanting larger yards and everything that is not necessary.

I think what would be more important is discouraging that, but still allowing growth, as we have to in a free society, but just limiting it and making it smarter. There are many small things we could do to improve it, and they even save money, such as, of course, the driving factor and all of this other stuff. It is just ig-

nored from being different or just not known about. So not so much stopping growth. I would just support smarter growth.

Mr. PALLONE. OK. Thanks. I agree.

Mr. GILCHREST. Thank you, Mr. Pallone.

Mr. Kind, any questions?

Mr. KIND. Chairman Gilchrest, again, I just want to say how impressed I am with the presentation that we heard here from the high school students. It really is encouraging. I commend you and your leadership as well as Mr. Cardin and Mr. Pallone in the efforts that have been taken in regard to the enhanced protection and preservation of the Chesapeake Bay area. It is an incredibly valuable natural resources that not only effects the inhabitants and the wildlife in this area, but across the country. We are going to continue in our efforts working together to try to increase sound public policy in this field.

You and I have teamed up just a few years ago in regards to the farm bill, trying to increase resources under the conservation title, which is an important part of watershed management and private landowners' stewardship of their private lands, which also affects the runoff and the nutrients flowing into these water systems.

So it is encouraging to see the interest at this level, and hopefully, those of you going on to school, whether it is technical school or a college or university, may have a future career path in the science and water management area. Lord knows, we need a lot of help, as Mr. Cardin indicated, in the years to come from your generation to step up and assume the leadership of this vitally important issue.

So, Mr. Chairman, thanks again for holding this hearing, and I am happy to participate.

Mr. GILCHREST. Thank you, Mr. Kind.

Mr. Cardin?

Mr. CARDIN. Thank you, Mr. Chairman. I am reading the background document from the—is it South River—from South River High School, talking about the nutrient issue, which is very well done. The nutrient problem is a very serious problem in the Bay. It is getting worse, not better. It is one of the issues where we have not made the type of improvement that we would have hoped when we started this effort, again, 25 years ago.

You know that nutrient runoff acts basically to suffocate and does not allow the Bay to completely develop the way it needs to, whether it is the aquatic life or the vegetation. But to solve that problem requires a major investment. Waste water treatment facilities, which is one of the major ways that you can stop nutrient content in the Bay, requires a significant investment of public funds in order to modernize our waste water treatment facilities.

Governor Ehrlich and the General Assembly came up with what we call affectionately a flush tax, but it is a tax on the users of waste water treatment facilities in an effort to get more money to modernize those facilities.

I guess my question to you is, taxes have gotten to be such a terrible word in our vocabulary here in Government, but sometimes we need additional revenues. I am a Democrat, and Governor Ehrlich in a Republican. I supported his efforts to try to find more cre-

ative ways to get money into the improvement of our waste water treatment facilities.

I think we need to talk about that directly. Money just does not automatically come into Government. You have to find ways to get it into government. Waste water treatment facility plants are owned privately and by governments. But to make that investment to upgrade the facilities will cost money. Someone is going to have to pay for it.

So I would just like to know your attitude as to whether you think, as a society, we have an obligation to collect enough revenues in order to make a dent in the problems that are really out there with the Bay.

Ms. LOGAN. Actually, I think that if you want Americans to give you money, you have to supply them with something that they like. And something that is associated with the Chesapeake Bay is the crabs. I mean, who doesn't like eating crabs, unless, in the case if seafood makes you sick or you don't like seafood. But if you enjoy eating crabs, if you implement, maybe, a tax on crabs or maybe you have a program that incorporates crabs or seafood in general with the tax, it would help bring in money for the Chesapeake Bay to help that.

Mr. CARDIN. That is a good suggestion.

One side of the South River is in my district. The other side is in Congressman Gilchrest's district. I have offered Congressman Gilchrest to join me on a kayak as I went last year and looked at some of the oyster beds and saw the condition of some of the oyster beds. They are trying to plant seeds for oyster in the South River. You have to plant about 100,000 to get one or two to take, but it is so important for filtering the Bay.

I just invite you all to get hands-on as to what is happening in the Bay itself, and I think it will show you just the damage that is done by nutrients. There are a lot of causes for the nutrients. Some of it is farming practices. Some of it is industrial pollution. Some of it is the way we treat our runoff from storms. And some of it is the way we treat our waste. Some are easier to deal with than others. We know that, if we make an investment in waste water, what exactly we can obtain in getting nutrient levels reduced.

So I would just encourage you, as you are doing, to get more hands-on. I think you are exactly right. If you make the case, the people in our community are willing to make the investment if they think they will get a good return for that investment. But I do not think they really see the problems in the Bay like you have seen them. So I just would encourage you to continue your efforts to do hands-on and get more and more people in the community to understand the damage that is being done by the failure to address modernization of our waste water treatment facilities or by irresponsible use of fertilizers or the runoff issues by development and not being sensitive. Things you can do in development to minimize the damage caused by runoff.

Mr. Chairman, just for the record, we have a school in Annapolis in which we give a very small Federal grant that they are using to replace concrete with gardens which run into Weems Creek. That is having here a major impact in trying to reduce the amount

of runoff. These are the types of projects that make a difference, but it requires investment.

Yes, the private sector is willing to come up with money, willing to give charitable contributions, but it also requires Government to be an active partner. And this money just does not automatically appear. It requires us to make tough choices here in Washington. And we need your help and your understanding on those choices.

Thank you.

Mr. GILCHREST. There is a young lady in the back of the room that wanted to make a comment.

UNIDENTIFIED SPEAKER. One of the major things with taxes is people want the problems to be solved, but they do not want to pay for it. Sooner or later, especially in our area—we are right on the water—they are going to have their waterfront property but not be able to use the Bay because it is so polluted. And they just will not pay for it. People do not realize the changes going on, and that is the major problem that has to get out there for them.

Ms. ELKIN. My name is Julie Elkin from Broadneck High School. Regarding costs and taxes, I understand it is not generally popular to support, but I think the question is not necessarily people unwilling to pay as much as being unaware of how critical it is. I mean, the majority, I think, here come from waterfront communities. And they know. In my own community, there are river associations that keep citizens informed. And those have been really helpful in getting out the word to citizens further inland regarding the problems.

But if the funding is not available necessarily from taxes, putting it into education, that really helps if we can get out and spread the word. Because an aware community is one that is more willing to make the investment.

Mr. GILCHREST. Thank you. Thank you very much.

At 11:15, and unfortunately, this is the way it happens up here, we are going to have votes for about a half an hour or so. So we will, I am not sure—we have this room until 5:00, but we have to deal with the votes. We have lunch for everybody. So when the bells ring, if I could just speak to a couple of the teachers, especially those from Bohemia Manor and Pocomoke, we will try to adjust your testimony in and around the time we eat lunch. If you could stay—I am not sure when you have to leave to go back to the Eastern Shore, but as soon as the bells ring, we will have a quick discussion about how long you can stay. And we will come back here and either have your testimony before we eat lunch or have it right after we eat lunch.

But I just had a couple of quick questions for the people from South River, Olivia and Bryan.

You talked about a crackdown on marina operations for just a whole range of issues, whether it is pump-out stations, whether it is the speed in which the motor boats pass through or those kinds of things. Could you elaborate or give some of your recommendations on how you would crack down on marina operations?

Ms. LOGAN. It was actually marine sanitation devices, which is kind of like that. We said some of the preventable problems were sewage discharge, failure to meet EPA standards which would be the heads and the toilets which people get away with because they

do not have their boat inspected. Also, the lack of on-shore pump-out stations or the failure to maintain or rinse the MSD.

Mr. GILCHREST. Where would you require more pump-out stations? At private marinas, public docks? Where do you think they should be?

Ms. LOGAN. Public would probably be better because everyone can use it. Now, with private, only a limited amount, but with public everyone will be able to utilize it, and there will not be any distinction or who is better, "You cannot go to the private one."

Mr. GILCHREST. Are you aware of any pump-out stations at all on any public docks?

Ms. LOGAN. Well, I do not have a boat, so I do not know.

Mr. GILCHREST. Do you have a recommendation on who would operate that pump-out station on a public dock?

Ms. LOGAN. DNR, or, you know, it would even be a great summer job, get a nice tan, you know. I would do it.

Mr. GILCHREST. You wouldn't want to overdo it. Make sure you use that sunscreen.

A question about the bulkheads, uniform bulkhead policy. I think that is an excellent recommendation, but the creation of the uniform bulkhead policy, I think the kind of bulkhead would be pretty important as well. Mr. Cardin mentioned something about natural, creating a natural bulkhead to reduce sediment being washed in. And those 4-by-4s or 6-by-6s that a lot of people use may stop some erosion, but they are also wood that is treated with creosote. Sometimes, if it is a rock bulkhead, that would eliminate the possibility for a full range of species from moving, marine species from moving on that shoreline.

Do you have any recommendations for the kind of bulkhead that would be used?

Mr. JAMES. Well, I do know that the bulkhead we have in most houses around our community, they have a special kind of treated wood that is conducive to the environment of the Bay. It is not going to contaminate it. Capitol Marine is the one that does that. I do not know about the others.

A big problem is people without permits putting their own bulkheads in and things like that. It is really unregulated, and people just do it.

Mr. GILCHREST. So do you see that as a State issue or a county issue?

Mr. JAMES. I think it is more of a county issue. One of the problems is DNR does as much as they can, but if you only have one guy on a Boston whaler patrolling three rivers and pulling the guy over on a jet ski while someone is building a dock 200 feet out into the water—

Mr. GILCHREST. Anne Arundel County right now does not have a uniform bulkhead policy?

Mr. JAMES. Correct. Also, you can see when bulkheads are put up by the people themselves, and they do nothing.

Mr. GILCHREST. Would this be a recommendation that you and your fellow students could make at a county council meeting in Annapolis for Anne Arundel County?

Mr. JAMES. It could be.

Mr. GILCHREST. I would also encourage, and maybe I will write a letter to the county executive and the county council for each of the areas that all of the students here represent to have you go in and talk to the county council or the county commissioners or the town council or whatever, because the kind of information that you have here is not broadly understood among a lot of elected officials or the general public.

One final question that any one of the panelists can answer, has there been any thought in your discussions about the Chesapeake Bay concerning invasive species? On the Eastern Shore we have this little critter known as nutria. All over the Bay, we have phragmites, and now we are hearing about snakeheads.

Do you want to make a comment about anything related to invasive species and the health of the Chesapeake Bay?

Mr. JAMES. I do know in our area, the mute swans, they are not native to the area, what they do a lot of times—

Mr. GILCHREST. Can you speak up for the gentleman from New Jersey? We discuss that issue sometimes.

Mr. JAMES. They are eating the aquatic vegetation. That is not leaving enough food for all of the native species. That is wiping them out.

Plus, it is also contributing to erosion, because when those things are being ripped out by roots, it just damages all the soil around it, and it makes it a lot softer, a lot less solid, and it roots it out. We have about six of them coming out. They come around and eat everything, so that is the biggest.

Mr. GILCHREST. What do you do to those mute swans?

Mr. JAMES. Basically, I let the dog out the backyard, and he chases them off.

Mr. GILCHREST. What a good idea. We had a hearing last week on the Migratory Bird Treaty Act which, based on a court decision, protects mute swans and other native migratory birds that might come here from Canada or even Alaska.

Mr. JAMES. The problem with the mute swans is they are not native at all, and they destroy other habitats. I have seen them go and turn over duck nests and things like that and destroy them. We have muskrat nests along the waterway. They go and destroy those, looking for food. They are basically just a destructive force.

Mr. GILCHREST. Do you have a recommendation, anyone in the audience, about what to do with invasive species like mute swans?

Well, anyway, you have all done a fabulous job here this morning. As usual, the hearings take a little while. We have more questions than we have time for.

But if anybody—Mr. Pallone, Mr. Cardin—any further questions for the students?

Thank you very much. You have done an excellent job here this morning.

Any further recommendation for us before this panel concludes?

All right. Well, thank you very much. I think we will have time to introduce the next panel, and we will go as far as we can before the bells ring, and then we will sort of discuss how we will proceed the rest of the day.

Christian, Jamie, Olivia, and Bryan, thank you very much.

Mr. JAMES. Thank you.

Ms. LOGAN. Thank you.

Mr. GILCHREST. Our next panel will be Sarah Lucs-Haji and Charlotte Sanford-Crane, welcome, and Leslie Levin and Kenneth Nugent. Sarah and Charlotte are from Chesapeake City, a wonderful little spot on the Eastern Shore, and Leslie and Kenneth are from Pocomoke High School, Pocomoke, Maryland. Thank you very much, and welcome.

We can begin with Sarah and Charlotte.

STATEMENT OF SARAH LUCS-HAJI AND CHARLOTTE SANFORD-CRANE, BOHEMIA MANOR HIGH SCHOOL, CHESAPEAKE CITY, MARYLAND

Ms. LUCS-HAJI. Thank you.

Ms. SANFORD-CRANE. I am Charlotte. Thank you very much for having us here.

We would like to talk to you today about our watershed at the Bohemia Manor High School community.

The picture you can see there of the bridge, that is about half a mile from our high school. It is right there. We could probably walk.

Ms. LUCS-HAJI. Our tributaries that surround our school, there are four main ones. The first one is the C&D Canal, which you saw on the first slide, and that is located right at the intersection. The second one is the Bohemia Manor River, and this is another major tributary that boats go down. But the major commerce is through the C&D Canal. The third is the Elk River, and the fourth is the Sassafras River. They are all four major tributaries of the Chesapeake Bay.

Ms. SANFORD-CRANE. We have three main problems that we found with our area. The first is water pollution, and this is of the surface and ground water. This includes runoff, nitrogen, phosphorus, Mercury, other organic material, and also bacteria. There has been E. coli found on some of our beaches, such as Crystal Beach and Grove Neck, which are all places around our school. And that is not a good thing for swimmers and people who actually live on those beaches all year-round.

The second main problem were invasive species, such as phragmites and cattails that have kind of taken over everything that is trying to grow native. And there is nutria, too. That is the rodent-like thing on the bottom. They were brought over for fur, but nobody actually likes their fur, so they let them go. And they are kind of everywhere.

The third problem is loss of habitat, and this is bad because, well, we need habitat for the animals to live and for the oysters to clean the Bay and for everything.

Ms. LUCS-HAJI. Our human causes are the population, urban sprawl. Cecil County is the fifth on the State's top 10 list for growth. It has doubled in the past year.

Sewage treatment causes lacks in this, too. There are so many houses that are being built, and there is not enough septic treatment plants to take all the sewage. So many people have illegal septic systems that are aging or overcapacity.

The Elkton plant that is located 15 miles from our high school has been marked unacceptable a couple of times where it dis-

charges more—it discharges 8.1 million grams per liter of nitrogen into the water. And 3 milligrams are acceptable.

The septic systems are not maintained, and that is a major problem, because it adds nitrogen and phosphorus into our bay.

The commercial shipping and recreational boating is another problem. The C&D Canal has many boats that come through, and they bring ballast water and have invasive species that fall off with it. Litter, oil and sewage also come into our bay from the C&D Canal.

Dredging. This was another topic. Maybe 3 years ago when I moved into the area, the C&D Canal was dredged, and many animals were displaced. And the ecosystem has thus recovered, but not quickly.

The fourth one is farming. We have farmers that live around our area, but they are more aware of the nitrogen that they put on their fields and the chicken waste. So I don't think they are the main culprits. I think that the sewage treatment plants are the main culprits in our area.

Ms. SANFORD-CRANE. Solutions. We came up with some solutions to help with these problems. In order to help the habitat destruction, we thought that we should help with the smart growth, which is what we were talking about before here with the houses and less yard and all of that, and also land conservation.

There is a big program where we live where people try to buy the farmland. They do not buy the land, just the rights. So the farmers still live there, but they can't subdivide it and make it into lots of little houses. It has to stay as a farm.

Also, there is down-zoning, which is a big buzzword around our area now. And the other thing is sewage pollution. To help with that, the big thing is, we really need to update the sewage plants, which is pretty spendy, but that is really the only answer to help, is build new ones and fix the ones we have. There is new technology that can really help with the nutrients, but it has just been implemented.

Also, we should raise the perk test standards. Right now, they are really low, probably because our area has very clay-like soil and in other areas, very sandy soil. And right now, the current standards say that is OK. And the sandy soil, when they do the perk tests, the water just runs right through. So our standards say, "Well, that is fine, it went through." but they do not realize that it has not had time to get filtered.

The farmers, as we said before, they are already pretty well controlled. They have best management practices. We are in a very rural area, so the great majority of our 150 watershed school area is farmland, but they all use best management practices, or at least quite a few of them do, where they try to plan out how much fertilizer they actually need and how much it is going to cost them. And they really do a good job of rotating crops and all of those good things.

For the boating and shipping, what we need are stricter boating regulations and a clean list of species. What that is is—right now, there is a dirty list, as in well, we know nutria are bad now, so we won't bring anymore in. But what we should have is a clean list where we only let things in that we know are good. Because how

do we know the next animal that someone decides to bring over is going to be good or bad? And we do not know. So we let it over until we realize, oh, no, it got away, and it ruined everything, better not let that happen again. So that would really help stop anymore invasive species from coming over.

We also believe the educational programs are very important. These can be things like bay schools, which we discussed earlier. Our middle school is a bay school, and we do projects like going to Smith Island and also community environmental clubs, just to get the community involved and aware. We don't have anything like that in our area, where everyone can come together and talk about what they can do to help. So that would be nice to have.

And the last solution would be legislation, such as the Clean Water Act, which was just passed. And that would help control all of the pollution happening.

Ms. LUCS-HAJI. Funding. Well, on the State tax level, the flush tax has already been implemented. And that is on average \$2.5 a month for the average homeowner.

The septic pumping service, this is still under Tax and Licenses. The septic tax service should be passed on to the actual homeowners, not the county. So it is equally divided into the actual people that live in the area, because they do not pay anything. The Federal income tax credit should be applied to taxes on the licensings, boating, fishing, and hunting.

A tax break should be used for upgrading septic systems. Maybe people that feel the need to upgrade their septic system and selling their land rights, maybe for more environmentally safe areas and an energy tax cut credit, just to make our area environmentally friendly.

Grants, the school community and educational programs have been given grants in the past, but I think there should be more that should be implemented. Through our local government, we need help with our septic systems.

So much urban sprawl and our septic systems are aging, and the Chesapeake Bay grants to aid—the Chesapeake Bay Agreement that was funded by Congress in 2000—critical areas in our area that developers are trying to harm with urban sprawl. And they are going to do this because there is no one stopping them, and the land has not been set aside.

Ms. SANFORD-CRANE. OK. Are there any questions?

[The prepared statement of Ms. Lucs-Haji and Ms. Sanford-Crane follows:]

**Statement submitted by Bohemia Manor High School,
Chesapeake City, Maryland**

**Contact/Advisor: Cheryl Lee, Lead Science Teacher;
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**Students: Sarah Lucas-Haji, Presenter
Peter Carrion
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Charlotte Sanford-Crane
Julia Stone
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**THE CHESAPEAKE BAY IN THE BOHEMIA MANOR HIGH SCHOOL COMMUNITY:
A RESTORATION PLAN**

- 1) Our Tributaries—watershed area of high school community is over 150 square miles
 - a) C&D Canal
 - b) Bohemia River
 - c) Elk River
 - d) Sassafras River
- 2) Problems
 - a) Water Pollution—Surface and Groundwater
 - i) Run-off
 - Sediment
 - ii) Nitrogen
 - iii) Phosphorous
 - iv) Mercury
 - v) Other Inorganic Material
 - vi) Bacteria
 - E-coli
 - b) Invasive Species
 - i) Fragmites
 - ii) Cattails
 - iii) Other exotic organisms, e.g., Snakeheads
 - c) Loss Of Habitat
 - i) SAV
- 3) Human Causes of these Problems
 - a) Population/urban sprawl
 - i) Increase in Impervious surfaces
 - ii) Loss of farmland, forests and wildlife habitats
 - iii) More pollution
 - b) Sewage Treatment
 - i) Sewage Treatment Plants
 - Aging
 - Over Capacity
 - ii) Septic Systems
 - Not maintained
 - c) Commercial Shipping and Recreational Boating
 - i) Dredging
 - Canal
 - Elk River
 - ii) Pollution
 - Ballast Dumping
 - Litter
 - Oil
 - Sewage
 - d) Farming
 - i) Fertilizers
 - ii) Animal Waste
- 4) Solutions

- a) Habitat Destruction
 - i) Smart Growth
 - Down-zoning
 - ii) Land Conservation
 - Buy land rights
 - b) Sewage Pollution
 - i) Updated Sewage Plants
 - Improve Technology
 - Expand citizens covered by current plants
 - ii) Raise Perk test standards
 - Sandy Soil not ok
 - c) Farmers
 - i) Best Management Practices
 - Already implemented
 - Soil Conservation Districts
 - d) Boating/shipping
 - i) Stricter boating regulations
 - ii) "Clean list" of safe species
 - e) Educational Programs
 - i) "Bay Schools"
 - ii) Community Environmental Clubs
 - f) Legislation
 - i) Clean Water Act
- 5) Funding
- a) State level taxes
 - i) "Flush Tax"
 - New to Maryland
 - ii) Tax on Licenses
 - Boating
 - Fishing
 - Hunting
 - b) Federal Income Tax Credit
 - i) Tax break for upgrading septic systems
 - ii) Tax break for selling land rights
 - iii) Energy Tax Credit
 - c) Grants
 - i) School/community education programs
 - ii) Local Governments
 - Upgrade sewage treatment
 - iii) Chesapeake Bay Grant
 - d) Fund Recommendations of Chesapeake Bay Agreement (2000)

Mr. GILCHREST. Thank you very much, ladies. Excellent presentation.

I think what we will do before we begin the questions, we will listen to Leslie and Kenneth from Pocomoke, and we will try to get through your testimony before we have to leave.

So Leslie, Kenneth, you may begin.

I would like to help the Bohemia Manor High School students and teachers go before the Cecil County commissioners and give them the same presentation. We will work on that down the road.

Leslie and Kenneth, you may begin.

**STATEMENT OF LESLIE LEVIN AND KENNETH NUGENT,
POCOMOKE HIGH SCHOOL, POCOMOKE, MARYLAND**

Ms. LEVIN. Hi. Thanks for having us.

Mr. GILCHREST. You are welcome.

Ms. LEVIN. We will get right into it.

Our Pocomoke River, as you can see, it starts in Virginia as a pretty small—

Mr. GILCHREST. Could I just say something very quickly, the way you started was poetry: "our Pocomoke River," it is just a nice way to put it.

Ms. LEVIN. Thank you. It starts as a smaller river and eventually gets bigger as it gets toward us. It goes into the Pocomoke Bay. Also, the reason why it looks the way it does is because it goes through the Cyprus swamp, which gives it a tea color, which also kinds of hides the problems that we have with it.

Our main problem would have to be poultry. We have 600 million chickens, and one-fifth are raised in our counties. Because of all of those chickens, we have a lot of waste. And those chickens, the waste that they use, the farmers put it back on their lands to save money. There is a lot of money coming in from it, and people do not want to change from it. We have 14,000 people in our area from Tyson, Perdue and Mountaineer, so it helps our economy.

This is just a picture of a chicken house.

Where the problem comes in with the chicken waste is, we have 13 million pounds of phosphorus and 48 million pounds of nitrogen. And the problem is—and the phosphorus is going up. Chickens do not use as much phosphorus in their system as they need nitrogen, so the waste that comes out has more phosphorus. And that tends to be a problem.

This is just a place where they store the waste. And the ground water, as you can see, 80 percent comes from underground sources, and one-third of that ground water has been contaminated from the nutrients that the manure is put on the fields. And it runs off and then gets into the underground water system.

Solutions would be, you could burn the—find a way to use the manure as a fuel, or you could convert it into fertilizer pellets. But it would have to be regulated by either the Government or the county. You would have to have some kind of specialist that would know how much and test the soil to see what kind or how much they need.

The nutrient management plan would have to be enforced for the farms to see that there would be no nutrients running off into the river.

They found that phytase, if you add it to chicken feed, it reduces the phosphorus that the chickens do not use. So a way to kind of help that would be to give the farmers money to add the phytase to the waste or somehow give them advantages that, if they do have to pay for it, they will get something out of it.

Our agriculture, as you can see, it is a very big industry also. With the agriculture and the farms, we have all this fertilizer that they have to use, and they use the chicken manure. Because of that, we have the nitrogen and the phosphorus that is getting into the Chesapeake Bay by going through the drainage ditches that are not monitored well. They get into the Pocomoke River, which causes problems also. As you can see, nitrogen pollution is one of the serious problems with the Bay.

Phosphorus is more difficult to deal with because it is not as readily absorbed as the nitrogen, because it does not take as many forms as the nitrogen does. And phosphorus, because it isn't used as much, it accumulates. And there was a study done at UMES, which is the University of Maryland, Eastern Shore, that showed

that there was so much phosphorus in the soil that collects, something like 25 years, before they needed phosphorus.

And this is just what I was talking about. They found that gypsum could be added, and that it would help control the phosphorus that is in the soil

Also, the drainage ponds would help for sediments or anything that is in the water, is coming from the drainage ditches to settle to the bottom before it would move on and cause any problems in the Pocomoke river and further, the Chesapeake Bay.

Mr. NUGENT. Sedimentation is also a big problem. As you can see, it comes mainly from nonpoint sources like construction sites, agriculture, and dirt roads and any other places that there is uncovered dirt. And what happens is like anything, like rain or even vehicles going on it—like on there—it kicks up a little bit of dust which then gets into water sources and will eventually reach the Pocomoke River and the Bay.

And right there, you can see again how much dust is kicked up on just a dirt road. And some things that can be done to help fix this are limits that are set on exposed land and when cover crops should be planted on empty fields. And also dirt roads need to be covered up. And if they are paved, there could be buffer strips on the side to stop runoff or cover them up with gravel or other types of vegetation to stop so much sedimentation from being formed.

And like Lindsey said, tannic acid is a unique characteristic of the Pocomoke River. From all the cypress trees that actually get into the river, it turns the water to a tea color.

Mr. GILCREST. Keep going.

Mr. NUGENT. And this is how the Pocomoke River got its name from the Native Americans who lived here. They named it Pocomoke, meaning “dark water” from that coloring.

And like you can see there, wastewater counts for 32 percent of the nutrient flow into the Chesapeake Bay. That shows to you how inadequate the water treatment plants are in our area, which is another big problem.

Here, you can see that the Pocomoke River water treatment plant has recently been given a grant to upgrade to a 5A class treatment facility. And this will result in a 55 percent reduction in nitrogen and 33 percent reduction in phosphorus. And Snow Hill is also a little town on the Pocomoke River, and their mayor has also requested a grant to update the water treatment plant.

And another problem is the old pipes, that they are cracked, and they leak into the groundwater which, then, in turn, gets into the river and then into the Bay.

Here is another problem with the groundwater: Fertilizers and pesticides used by homeowners, they do not have any regulations. They collect in storm drains, and especially when there is a lot of rain, then it will just go straight into the river. And a solution for this is that all storm drain water should be sent into the wastewater treatment plant and filters. And that will remove toxins, fertilizers and chemicals.

And whenever you hear about the Pocomoke River, you hear about Pfiesteria. And right there is a fish that has been infected with Pfiesteria. And in 1997, 20,000 to 30,000 fish died in the Pocomoke River. This is known as fish kills. And it has not exactly

been pinpointed if Pfiesteria did this, but many scientists think that it was.

And Pfiesteria is a single-celled micro-organism. And it has a life cycle of 24 stages. And not many stages are dangerous, but there are toxic stages that affect the fish and can even affect humans if they swim in the water or come in contact with it too long.

And like I just said, it takes certain things with the water to let Pfiesteria reach that stage. And these are water temperatures exceeding 70 degrees, low salinity levels and the presence of large quantities of fish, which would make the Pocomoke River a good area for that.

And a problem related to the nitrogen and phosphorus is that some Pfiesteria feeds on the algae. And the algae feeds on the nutrients. So when there is a lot of nutrients in the water, the algae grows more and leads to more Pfiesteria. And this is what happened in the river in 1997.

Here is a map that shows where it was. The red box highlights the Shelltown Pocomoke area, site of the 1997 fish kills and lesion events. And some scientists hypothesize that the Pfiesteria weakened the fish, allowing the fungus to create lesions on the menhaden. And other scientists have hypothesized that the lesions were caused by the Pfiesteria itself, which would also be a big problem.

And as a result of Pfiesteria, the American Rivers 13th Annual Report named the Pocomoke the third most endangered river in the United States, which shows how much of a problem it is. And even though it is so small, it is one of the most widely studied and monitored rivers in the United States, because of this Pfiesteria problem.

And through our research, we found that education always comes up with a good solution to the problems. Like people might be aware that there are problems, but they do not know how to fix them. And through education, we hope that this is the way to go to solve these problems.

And we have to direct it toward everyone—homeowners, farmers, watermen, people involved in the poultry industry, students, teachers and anyone who comes in contact with it. And an example of this is the construction workers—not pointing fingers at anyone—but just exposed dirt that is left for extended periods of time with big machinery rolling over it. And all the water from rain just kicks up so much dirt that, even if they just know that, if they are just covered up, or plant buffer strips, like easy solutions like that will make such a difference.

Right here is an example, from the education, what can be solved. Right next to the Pocomoke River we have a discovery center that is currently being worked on. And students go there. And doctors are there that will teach them about the river and what they can do to just—during the summer, if they do not have something to do, they can go to help the river or go to the discovery center.

[The prepared statement of Ms. Levin and Mr. Nugent follows.]

**Statement submitted by Pocomoke High School,
Pocomoke, Maryland**

**Thomas Gladding
Amber Mason
Leslie Miller
Kenneth Nugent
Steven Payne
Maurice Waters
Mrs. Amy Lines (Advisor)**

INTRODUCTION

The Chesapeake Bay is a unique and diverse ecosystem. It is the largest estuary in the United States. About half of the Bay's water comes from 150 rivers, streams and creeks. The Bay's watershed expands through six states including Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia. The Chesapeake Bay contains approximate 11,600 miles of shoreline, nearly 200 miles long and 25 miles wide at its widest point. The Bay's water capacity is approximately 18 trillion gallons of water.

One of the rivers included in the Chesapeake Bay's watershed is the Pocomoke River. "Pocomoke" is an Algonquin word meaning "dark water." The dark water of the Pocomoke is the result of tannic acid from falling cypress leaves, which results in a pH of 5-6 throughout the river. The river is nearly seventy-three miles in length and originates in the Great Cypress Swamp on the Delaware-Maryland border and flows approximately sixty miles through Maryland into the Pocomoke Sound at the Chesapeake Bay.

The Pocomoke River watershed is a large area; it spans over 170,000 acres of farmland, which consists mainly of a large poultry industry. The Pocomoke River is relatively narrow and very deep until it reaches Shelltown, Maryland where it opens rapidly into the broad and shallow Pocomoke Sound. The National Oceanic and Atmospheric Administration has recognized the Pocomoke Sound as one of the largest shellfish producing areas in the Chesapeake Bay. The Pocomoke Sound is considered to be the mouth of the river and is bordered by both Virginia and Maryland.

A unique habitat of the area is the Pocomoke River Swamp, which is thirty miles long and two miles wide. It contains the northern most cypress swamp in the United States. There are more than 27 species of mammals, 29 reptiles, 14 amphibians and 172 birds identified in the wetlands bordering the river. Pileated woodpeckers and bald eagles are not uncommon.

In the 1700's and 1800's, the Pocomoke River was a trade and shipping route. Shellfish, tobacco, fish, cypress trees and pelts were harvested and shipped as far as the Orient from Worcester County's largest city. Over time, the forest was cut away, agriculture expanded. In the 1930's the government sponsored the draining of the swamp because of the limited amount of high ground suitable for agriculture. Channels and ditches were carved into the landscape. Changes in agricultural practices including plowing, followed due to an increasing demand for grain to feed the nation. Soil erosion has increased ever since. These changes to the landscape and harvesting of timber resulted in an erosion of the river's banks and a deepening of the river. Both of these still impact on the health of the river today.

The National Park Service, U.S. Department of the Interior and the Nationwide Rivers Inventory as a "Great River of America" list the Pocomoke. The periodical "Field and Stream" called the Pocomoke River one of the "last undiscovered rivers" of the nation.

Today, the Pocomoke River is challenged and threatened by faulty wastewater treatment, failing septic systems, the poultry industry, agriculture, sedimentation and channelization. In 1998, the Pocomoke River was named the third most endangered river in the United States by the American Rivers 13th annual report on America's Most Endangered Rivers, due mostly to nutrient problems associated with chicken manure and the outbreak of Pfiesteria that killed tens of thousands of fish and sickened watermen and boaters.

THE IMPACT OF THE POULTRY INDUSTRY ON THE POCOMOKE RIVER

The main industry located in the Pocomoke River's watershed is the poultry industry. Over 600 million chickens are produced annually on the Eastern Shore. One-fifth of the chickens raised are located in Worcester and Somerset Counties, both located in the Pocomoke River's watershed. The chicken industry is a powerful \$1.6 billion continually growing business. Over 14,000 people are presently employed by the poultry industry. The birds are raised in poultry houses owned and operated by small farmers who are responsible for disposing of 750,000 tons of chicken waste

per year. One method of disposal is the use of the chicken litter as fertilizer. However, recent studies have found that many areas on the Delmarva Peninsula possess two to three times more manure than needed to fertilize local crops.

The water quality of most rivers on the east coast of the United States has improved since 1980 but the Pocomoke River's condition seems to have worsened. Many feel the increase in the poultry industry continues to affect the River. Many citizens work in the poultry industry and rely on this industry for their livelihood. The industry helps to support bankers who finance chicken houses, farmers who grow chickens, grain farmers, truck drivers and plant workers to support the chicken industry. It has been estimated that a 4 percent decrease in the chicken industry would wipe out thousands of jobs and up to \$74 million in economic output necessary for our area.

The chicken industry grew by one-third from 1982 to 1997. Cropland was reduced by 15%. Some estimates include the doubling of chickens on the Lower Eastern Shore, including the Pocomoke River watershed. An increased demand for chicken has resulted in an increase in the number and size of chicken houses being built and are being built in thicker clusters. The chicken houses are being built closer to the slaughterhouses to reduce trucking distance and time. There is a slaughterhouse 15 miles south of Pocomoke City.

Weather has an effect on the amount of pollutants produced by the production of chickens. An increase in storms sends more waste related materials into the Pocomoke River and its watershed. Droughts decrease the amount of pollutants entering the river.

Chicken manure has higher quantities of nutrients than manure produced from other livestock grown on the Eastern Shore of Maryland. Chicken manure contains more phosphorus than nitrogen. This waste contains approximately 13 million pounds of phosphorus and 48 million pounds of nitrogen. The watershed area of the Pocomoke River houses over 100 million chickens and 60,000 hogs, producing close to 250 million pounds of manure each year, along with bedding litter and the remains of chickens killed in production. Phosphorus concentrations in the Pocomoke Sound have increased more than 25% since 1985 according to EPA data. When a farmer applies enough manure to deliver the nitrogen needed by a specific crop, a surplus of phosphorus goes with it. More than 90% of soil samples tested by the University of Maryland Eastern Shore in 1997 showed elevated quantities of phosphorus.

Air pollution directly relates to the pollution of nearby waterways. All chicken manure must be removed in one of three ways, released into the air, put into the water or spread on the land. Fans are used in chicken houses to remove excess ammonia. Ammonia gas, which is a form of nitrogen, floats off piles of manure. It then settles into nearby ditches and creeks.

Nutrient pollution also affects groundwater. Nitrates contaminate one-third of all groundwater in Delmarva's agricultural areas according to the U. S. Geological Survey. Samples taken by the USGS indicate nitrate levels in ground water are three to four times as much as the EPA considers safe. Contaminated groundwater adds to the nutrient pollution problem reaching the Pocomoke River and Chesapeake Bay. The USGS estimates that as much as 80% of freshwater that flows into Delmarva's rivers and streams originates from groundwater sources.

Irrigation also plays a role in increased air pollution eventually settling as water pollution. Millions of gallons of treated water are sprayed onto fields. It then seeps into the groundwater. Some chicken plants spray wastewater close to the slaughterhouses and the wells inside the slaughterhouses have been contaminated. In some areas, this spraying practice has stopped but nitrate levels continue to rise due to the long-term movement of water.

There is massive regulations and legislation regarding the production of chicken. The Delmarva Peninsula consists of three states. Often chicken farmers in one state find less regulation in a neighboring state. For example, trucks from Perdue transport millions of gallons of waste a year from its Delaware slaughterhouses into Maryland where the manure is used on farms due to a lack of regulation on the dumping of manure in Maryland's fields.

The chicken industry has a very powerful lobby. Money is spent to back candidates who are supportive of the chicken industry. Poultry corporations hire lobbyists who lobby for legislation decreasing regulations. Advertisement, scholarships, baseball fields, support of Salisbury University are just some of the ways the chicken industry attempts to improve the image of chicken production.

An issue related to nutrient management is the question of who is responsible for the massive quantities of chicken waste produced. Some feel the large four brand name companies (Allen Family Foods, Mountaire Farms, Inc., Perdue Farms, Inc, Tyson Foods, Inc.) that own and market the birds and earn \$1.6 billion a year

should be responsible for the waste. Others feel the local farmer, who is under contract with the large companies and raises the chickens, is ultimately responsible for dealing with the manure. At this point, the growers own the waste and must deal with it. They must deal with chickens that die before they reach maturity. As a result of this decision, chicken manure is scattered on thousands of farms throughout the watershed and monitoring is almost impossible.

The only solution that may be feasible and ultimately good for the environment is to find alternative uses for chicken waste projects such as burning it as fuel or converting it into fertilizer pellets that can be economically trucked away as compared to heavy loads of manure. This process could be more feasibly accomplished if the large industries "owned" the manure and it was kept at a limited number of facilities. The industry has the resources necessary to develop alternative uses.

The most recent Maryland law, in effect as of 2004, forces all farmers to test their soils and apply no more manure than the crops need. A nutrient management plan must be developed and kept by each farmer. As a result some farmers who now rely on chicken manure will have to replace it with commercial fertilizer to get the nitrogen needed without the excess phosphorus not needed.

One other helpful method to decrease phosphorus is adding an enzyme called phytase to chicken feed. The phytase helps chickens digest phosphorus limiting the amount of phosphorus that ends up in the chicken manure. Due to the expense of adding this extra component to chicken feed, the legislature reimburses half the costs of the phytase.

Tax benefits and grants could encourage research and development of alternate uses for manure. This is extremely complex issue. The bottom line is the chicken industry is an integral component of people living in the Pocomoke River watershed. Discussions result in hot debates on both sides.

AGRICULTURE

One of the leading causes of pollution in the Pocomoke River and the Chesapeake Bay is the result of agricultural practices. Water carries pollutants long distances, and once pollutants get in water, they are very hard to remove. Nutrients, pesticides, sediments and pathogens used in agriculture move from the land and into the watersheds of tributaries, including the Pocomoke River, and from there they find their way into the Chesapeake Bay.

Agriculture contributes about 44 percent of the nitrogen and about 56 percent of the phosphorus entering the Chesapeake, according to Bay Program figures. In Maryland, agriculture contributes about 38 percent of the nitrogen and 55 percent of the phosphorus. Yet more than half of the fertilizer applied by farmers is never used by plants and percolates into groundwater, nearby ditches and ultimately into the Pocomoke River.

Fertilizers are used to promote plant growth. Nitrogen and phosphorus are common ingredients. When fertilizers are applied improperly and the plant cannot use them, they leach into the soil. When the plant cannot use all the fertilizer applied, the result is runoff. These chemicals support algae growth leading to eutrophication.

According to the Chesapeake Bay Foundation, nitrogen pollution is the most serious pollution problem for the Bay because it causes algae blooms that consume oxygen, which lowers dissolved oxygen levels so severely that fish and shellfish die. The majority of nitrogen pollution comes from sewage treatment plants, large-scale animal operations and agriculture.

There are many different sources of fertilizer used to supplement the nitrogen contained in soil. The most common soil fertilizers can be categorized as either inorganic or organic fertilizers. Inorganic nitrogen fertilizers often have the advantage of being concentrated sources of nitrogen and, therefore, a smaller amount is needed and transportation costs are lower. Nitrogen fertilizers are also mixed with fertilizer materials containing phosphorus and potassium to produce a fertilizer blend. Common disadvantages of inorganic fertilizers are often associated with poor management such as applying too much nitrogen fertilizer.

Organic nitrogen fertilizers often have a relatively low nitrogen content and, therefore, they are often applied to the soil in large quantities. They have the advantages of adding organic matter to the soil thereby improving soil physical, biological and chemical properties for plant growth.

Nitrogen is applied by farmers in the Pocomoke watershed in two forms, as both organic and inorganic fertilizers and as chicken manure. Over application of fertilizers poses a threat to the environment by increasing the risk of surface runoff of nitrogen into the Pocomoke River and there is also the risk of nitrogen leaching into the groundwater.

More funds for research and adjustments made to agricultural practices may help lead to some methods of decreasing nitrogen. Losses to the environment can be

minimized by crop rotation, planting cover crops, soil testing and ploughing in crop residues.

Excess phosphorus is much more difficult to deal with than nitrogen. Phosphorus is vital to root growth, seed formation, and increases disease resistance. Phosphorus is added to the soil to help plants absorb nutrients. Without it, more nutrients are lost to the environment. For most effective use of phosphorus, the fertilizer needs to be placed to ensure quick contact by growing roots and minimal contact with the soil. On agricultural land when annual application of phosphorus exceeds its removal by crops, then phosphorus will accumulate in soils.

Fertilizers containing phosphorus are not only used by farmers but are used as feed for livestock as part of poultry and hog feed. The digestive tracts of pigs and chickens do not adequately absorb phosphorus so phosphorus is added to the diet of chickens and hogs increasing the phosphorus in their manure.

Scientists at the University of Maryland Eastern Shore are studying methods to reduce runoff resulting from phosphorus used in fertilizers. One new control method being studied is the use of gypsum. Gypsum is a combustion by-product, which means that it is formed when coal is burned. Most phosphorus initially added to land through fertilizer or manure reacts with soil components, converting to an insoluble form or attaching to soil particles. Studies at University of Maryland Eastern Shore show gypsum, when spread on the soil, significantly impairs the vertical movement of phosphorus into the water table. Another advantage to use of gypsum is its cost; it is very cheap. Scientists at UMES only had to pay for the truck to deliver this by-product.

One of the main crops grown on farms on agricultural lands near the Pocomoke is soybeans. This crop is used for forage for livestock. On local farms, the new soybeans could be grown to produce forage that could be baled or cubed for shipping to other areas. There are three new "giant soybeans" which may actually pull more phosphorus out of soils than conventional soybeans usually grown for grain. The exceptional growth of these giant soybeans could make them useful in our area as well as decrease phosphorus in nearby waters.

Farmers in low lying, flat agricultural areas around the Pocomoke River use ditches to drain excess water off the fields. These ditches usually have very few if any buffer zones to assist in the absorption of fertilizers and nutrients. As a result, the level of fertilizers are concentrated in these drainage ditches which flow unobstructed directly into the Pocomoke River. A proposed solution is to reexamine drainage ponds. In the past farmers mishandled the drainage pond by using them for aquaculture and the fish. The fish often died, fouling the ponds and creating more problems. Drainage ponds act as storage units and allow the nutrients to settle before they flow into the river. Scientists are then examining the possibilities of dredging the bottom of the ponds and reusing the nutrients built up on the bottom. SAV's planted in these ponds also absorb nutrients and prevent them from flowing into the River.

Sedimentation in the Pocomoke River and Chesapeake Bay

Over the past 100 years, the net deposition of sediment entering the Chesapeake Bay from the Maryland portion has been estimated to be approximately 155 million metric tons. Scientists believe that sedimentation rates have continued to increase since colonial time due to an increase in population, logging, agriculture and different land uses.

The term "sediments" refers to any loose particles of clay, silt, sand and other substances that are suspended in the water and eventually settle to the bottom of a body of water. Sediments pose a serious threat for bodies of water including the Pocomoke River and ultimately the Chesapeake Bay. Sedimentation in the Pocomoke River is mainly derived from nonpoint sources including construction sites, dirt roadways, and agriculture

Massive quantities of sedimentation in the Pocomoke may cause problems ranging from clouding the water a bit, to smothering plants and animals at the bottom of the river. The clouding of the water may presents problems by blocking the sunlight to submerged aquatic vegetation necessary for photosynthesis. Sedimentation may not be as apparent in the Pocomoke River as it is in the Chesapeake Bay because the Pocomoke River is one of the Eastern Shore's "black rivers." Its tea color, characteristic of cypress swamps, comes from tannic acid in the roots and decaying leaves of trees and plants that line its banks. This darkened color means that light has never penetrated very deep and it is unlikely there was ever sufficient deep light penetration that would have permitted the presence of submerged aquatic vegetation. The natural dark color of the river makes it appear sedimentation is not a problem because it is not as apparent.

In the Pocomoke River, the size of each sediment particle is complicated by the fact that the individual sediment particles have a large surface area. These sediments act as chemical sinks and absorb fertilizers and pesticides from nearby farms. The pesticides cling to the particle and slowly release high concentrations of nutrients over an extended period of time. As a result of the size factor of the particles, sedimentation increases the nutrient content in the Pocomoke River.

The release of sediments into the environment is the result of a variety of activities. Sedimentation from natural sources accounts for 30% of sedimentation production from man induced activities accounts for 70% of sedimentation production. One of the main causes of this form of erosion is due to farmer's fields lying next to the river. The increase in development on the river itself and the lack of sufficient buffers result in an increase in sedimentation.

Weather conditions increase sedimentation. Weather conditions including temperature, storms and humidity may increase the rate of sedimentation. Precipitation moves soil great distances and ultimately these particles end up in the waterways. Once the sediments arrive in the Chesapeake Bay there are few ways to filter the amount and size of the particles out of the water.

Construction sites expose large amounts of sediments as a result of the movement of land. On a construction site, the first thing that takes place is the removal of all vegetation in the area. With this removing process, the roots that usually hold the soil in place are torn out of the land and the soil becomes loose and easier to move. During periods of construction, unprotected soil is usually left uncovered for long periods allowing the wind to lift the exposed sediments and carry them to the river. Runoff from construction sites can be 2,000 times greater than erosion occurring in woodland. The term "run-off" is used to describe sand and loose soil left on the land surface which can easily be washed by rain and water into the near by waterways.

A possible solution may be a training course for builders and construction site workers in sedimentation reduction followed by a certification presented for completion of the course. This practice has already been implemented by the Coastal Bays program and has participation in the training has shown to be successful.

Agriculture is a major contributor of artificial sedimentation similar to construction sites. Fields are harvested or cleared, exposing the soil and making the soil susceptible to run-off. Cover crops may not be planted immediately. Run-off from farmlands near the river usually runs into channels and then run straight into the river, carrying fertilizers and pesticides with it. Therefore, sediments are carried to the river along with toxins.

Limits need to be set on how long land may be exposed for construction and farming. Recently, (March 2004) sediment goals have been set. The first step of these goals is reducing from 5.05 million tons of sediment to 4.15 million tons of sediment that annually washes into the Bay from major tributaries. The second step of these goals involves shoreline erosion where reductions are being set on a case-by-case basis to help restore historic levels of grass beds, (Bay journal Marc 2004, pg. 16).

WASTEWATER TREATMENT

The Pocomoke City water treatment plant treats 1.2 million gallons of wastewater. The treatment plant has recently been upgraded from a 1C class to a 5A class plant. This means wastewater will now receive the third stage of treatment. The tertiary stage used in Pocomoke's water treatment includes the implementation of a Biological Nutrient Removal (BNR) system. The goal of the plant is to decrease the total annual nitrogen discharge to an average of no more than 8 mg/L. That is a reduction of 55 percent of the nitrogen and 33 percent of the phosphorus. It is expected to be up and running by June 2004. Wastewater accounts for 30% of the nutrient flow into the Chesapeake Bay

The Pocomoke City storm drains, like many other towns in the Chesapeake watershed, flows directly into the Pocomoke River. There are catch basins that collect debris and trash, and then the water goes into the river untreated. This filtered water still has liquidated toxins including fertilizers and pesticides used by homeowners. From these fertilizers, comes large amounts of nitrogen and phosphorus, nutrients associated with problems in the Pocomoke watershed. Solutions to the storm drain problem should include sending storm water to the water treatment plant to eliminate toxins, metals, and chemicals still present in the water

Pocomoke River State Park is located on the River and has approximately 250,000 visitors annually. The wastewater is treated through a septic system that is not checked annually. Therefore, this wastewater has may seep into the ground water and eventually run into the river. This septic system has 14 tanks allowing for drainage, one tank for each building according to the building's square footage. The drainage fields are only a few acres in size and are within several hundred feet of

the Pocomoke River. The septic system at Pocomoke River State Park needs to be examined to meet the growing needs of the Park and the effect of the wastewater on the river. This treatment should include an updated plant sized to accommodate the sewage flow. If a modern wastewater treatment is not built the drainage fields should be relocated further from the River to prevent any seepage.

Snow Hill is located on the banks of the Pocomoke River with a population of approximately 2,400. The town manager has requested a grant of six million dollars to help update wastewater treatment. Snow Hill has cracked sewage pipes, and sewage is drained right into the river. The treatment plant needs to be updated in order to reduce nutrient problems. If the town of Snow Hill receives money for the sewage treatment plant, nutrient overload Pocomoke River would be greatly reduced.

Oysters

A little known fact is the common oysters may be another possible solution for the problems of the Chesapeake Bay. In the past, the Pocomoke Sound was a major supplier of oysters. Oysters serve many important purposes in the Bay. Not only are they beneficial to the economy surrounding the Bay, but they also serve many important ecological purposes. For over 100 years, Chesapeake Bay watermen have made their living fishing and harvesting oysters. Until the mid-1980's, oystering was the most valuable commercial business in the Bay. Despite their economical importance, oysters are most beneficial in the ecology.

Oysters eat by filtering the nutrients they need out of the water. This not only gives the oysters food, but also cleans the water. Filtering takes excess nutrients out of water, settles sedimentation, and helps clear the water. Whatever the oysters don't consume gets deposited at the bottom of the body of water, where it is not harmful. According to the Chesapeake Bay Foundation, an adult oyster can filter an average of 60 gallons a day. In fact, before oysters were fished, the population of oysters would be able to filter the volume of the whole Chesapeake Bay, about 19 trillion gallons, in a mere two or three days. Now because of over fishing and diseases, it would take the remaining oysters up to a year to filter the Bay.

Another way oysters help keep a healthy ecosystem is by providing a habitat for fish. Groups of oysters will form oyster beds, a favorite living area and hunting area for a variety of fish. The fish that live in these oyster beds sometimes feed on the nutrients and sediments that oysters miss, which further serves to clean the water in the Bay.

Despite being a very resilient species, the oyster population in the Bay is rapidly disappearing. One obvious reason for the decreasing population is the over harvesting and over fishing. During the twentieth century, oysters were the most harvested animal in the Bay. Loss of habitat is also making it harder and harder for oysters to find a place to live. The tremendous amount of pollution getting into the Bay is just another element oysters have to fight. Parasites have been killing many oysters.

Two specific parasites have been the worst so far. These two microscopic predators are known as Dermo, *Perkinsus marinus*, and MSX, known as multinucleated spherule. These diseases thrive in waters with high salinity and temperatures above 68 degrees Fahrenheit. These diseases have been documented as early as the 1950's, but really hit hard in the 1980's.

These parasites are truly devastating to *Crassostrea virginica*, the oyster native to the Chesapeake Bay. However, oysters from different parts of the world have developed immunities. One such species is the Asian oyster, *Crassostrea ariakensis*. Some groups, including the Department of Natural Resources, Gov. Robert Ehrlich, and the Virginia Marine Resources Commission strongly support the proposal to artificially introduce this alien species to our ecosystem. They say that this new species will theoretically take the place of the old species if the old species can't make it. The Asian oysters will thrive despite the parasites, and the population of oysters will increase. This will help keep the Bay clean because the oysters will once again be able to filter the water. This also helps the Bay ecosystem by replacing the habitats oysters provide. Government officials also hope that more oysters will help the economy.

There are also some groups fighting the introduction of this alien species. Many scientists and environmentalists are urging that it is too early to determine if this other species will actually help the environment. They want more tests to be completed before any actions are taken. They are afraid that artificially introducing a species may throw off the very sensitive balance of the ecosystem. These people are also afraid that the cost will be greater than the profits. There may be an economic benefit if these oysters do work, but it will cost millions to discover if these Asian oysters are compatible.

Pfiesteria and the Pocomoke River

Pfiesteria piscicida is a single-cell microorganism. It has a very complicated life cycle that includes at least 24 flagellated, amoeboid and encysted states or forms. They may live for years in a tiny, cyst-like shells buried in river bottom sediments. If many conditions come together, the cyst-like shells hatch. The conditions must include a water temperature of 70 degrees or above, elevated levels of phosphorus, ammonium and suspended solids, moderate to low salinity levels, increase rainfall or runoff, and the presence of fish in particularly large number. *Pfiesteria* is very sensitive to elevated phosphorus enrichment. It seems to respond more to phosphorus at higher levels than it does to nitrates.

Excrement of fish, especially when they are found in large numbers, in an area where *Pfiesteria* are present, trigger the encysted cells to emerge and become toxic. Fish excrement can also cause another stage of *Pfiesteria* to develop. The small single cells swim toward fish prey and give off toxins in to the water. These toxins make the fish lethargic and often cause bleeding sores and hemorrhaging. Once the fish are sickened the *Pfiesteria* feed on the epidermal tissue, blood and other substances that leak from the sores. Dead fish cause the flagellated stages to transfer to a different amoeboid stage, which feed, on the fish remains. If conditions become unfavorable or food supply diminishes, the *Pfiesteria* develop a protective covering and sink back to a dormant cyst state in the bottom of the river. *Pfiesteria* may change forms in a matter of hours.

Pfiesteria also affects humans. Dr. JoAnn Burkholder of North Carolina State University indicates symptoms associated with exposure include short term memory difficulties and respiratory problems. Nausea and vomiting, eye irritation, suppressed immune system are other symptoms may exposure to *Pfiesteria*. In 1997, 20,000-30,000 fish were killed in the Pocomoke River and 13 humans were sickened. As a result of the fish kill in 1997 and the possible risks to humans a seven mile stretch of the Pocomoke River was closed for five weeks.

The Pocomoke River has received considerable attention and study after the initial reports of *Pfiesteria*. Temperature, salinity, precipitation, and water quality parameters including dissolved oxygen, nitrates, phosphates and turbidity are being monitored. In July of 2000, 9.6% of menhaden captured in the lower Pocomoke River showed ulcerative lesions. The majority of these fish were menhaden. *Pfiesteria* has been found in the river but not in its toxic stage. The conclusions drawn from this study include the belief that fish lesions were not the result of *Pfiesteria*.

The United States Geological Survey found high levels of arsenic and selenium present in the Pocomoke River and these two elements are known to stress fish and reduce their immunity to disease. It is hypothesized the fish are then more susceptible to fungus and bacterial invasions. Arsenic is added to chicken feed to kill parasites and promote growth and may be the source of the elevated levels of arsenic and selenium.

The only factor that humans can influence is nutrient levels. Nutrient levels in the Pocomoke during the summer of 1997 were high as compared to other areas in the Chesapeake's watershed.

CONCLUSION

Over the past fifty years we have become aware of the deteriorating health of the Chesapeake Bay. The Bay went through a period of rapid deterioration between 1950 and 1980. The Bay has changed from an ecosystem with clear water and extensive fields of underwater grasses and vast expanses of oyster beds to its present condition. It had a sustained population of fish and wildlife. Poor water quality, overharvesting and disease has taken its toll on the Bay. For two decades there has been considerable effort to restore the Bay but there has been only moderate improvement.

In 2001, the Chesapeake Bay Foundation's State of the Bay Report concluded the health of the Bay is still on the decline. The more we study the Bay, the more we find the harm people have caused this estuary and how difficult it is to repair the damage.

The main problems facing the Bay must be addressed by the states in the watershed representing the different perspectives of the people who live there. Each group has a different approach to solving the problems. So what can be done to meet the needs of the Bay and still satisfy the diverse population? We cannot afford to lower the bar or give up.

In 1933, the first regional conference was held to address the overall health of the Chesapeake Bay. The second major push for Baywide management took place in 1965. At this time, the U.S. Army Corp of engineers did the first study of the present and future conditions of the Bay. Their report was completed in 1977 and led to further Bay Agreements. Since their final report, there have been three Bay

Agreements, 1983, 1987 and 2000. The most recent Agreement has developed specific commitments and addresses living resources, habitat restoration, water quality, land use and community management. Further studies have been completed to project the state of the Bay to the year 2020. The goal of the Bay Agreements attempt to develop legislation and regulations that cross state boundaries. \$282 million in federal monies has been used to fund restoration programs for the Bay. The federal government must also expect the states to develop programs. It has been estimated that Maryland will spend \$6.30 million a year for Bay programs. Other states have not made the same commitment.

The Chesapeake Bay Foundation was established in 1967. This nonprofit group has stated that it will take at least \$8.5 billion dollars to meet the goals set by the Chesapeake Bay Agreement by the 2010 deadline.

It seems to us that identifying the problems associated with the Chesapeake Bay and the Pocomoke River is the easiest part of the solution. We understand how difficult it is to ask farmers to change their practices. We understand how important the poultry industry is on our local economy. Our economy is strongly influenced by tourism. We all use and enjoy the Pocomoke River. It seems it is necessary to find alternative methods to make it feasible for each of the interest groups to improve their role in improving the quality of the Pocomoke River and the Chesapeake Bay.

Education of all people in the Bay's watershed is crucial. The Delmarva Discovery Center will be opening in 2005 in downtown Pocomoke. This Center has many different goals but its main objective is to educate the people in the Pocomoke watershed on their impacts on the river. This innovative program will include educational programs for local citizens, students and teachers. The Pocomoke River is one of the most beautiful rivers that flow into the Chesapeake Bay. The Discovery Center is an exciting program that will reach our citizens and hopefully the Pocomoke River will return to its place as one of America's most beautiful rivers.

Mr. GILCHREST. We will help encourage them.

I—we have about 9 minutes. I have to go across the street to vote.

You did an excellent job. The votes should be no more than half an hour. We will come back and ask you fellows questions.

We have a House photographer here, I guess which means they have to take the picture now and not later. So very quickly, if all of you could just walk up here and stand behind us. That is what I am instructed to tell you. We will take the picture. I will come back in half an hour, and we will ask questions. I have about 2 minutes before we have to go.

[Recess.]

Mr. GILCHREST. The Committee will come to order. I trust everyone had a good lunch, a good break. We have about 20 minutes to a half-hour before some of us have to move on. But I want to thank all of you once again for coming. And I want to thank Bohemia and Pocomoke for coming back from these questions.

And the questions I ask, anyone on the panel can respond to. And certainly, anyone from the audience can respond as well.

The Bohemia High School did mention, I think, invasive species. This is appropriate for Pocomoke also. And you mentioned nutria, which is that little pleasant looking critter that you had at the bottom right-hand corner of the screen that is wreaking havoc in Dorchester county and a little bit in Queen Anne's county. And I wonder if you know if there are nutria in Cecil County.

Ms. SANFORD-CRANE. I haven't seen any where I live but one of our members said he had seen some. I don't know if they are a huge and widespread problem there, but I believe there are some that have made it up that far north.

Mr. GILCHREST. That is interesting. And it is not unexpected that those are one of the invasives that could wreak havoc on the marsh grass, even up in Cecil County.

Ms. LUCS-HAJI. We got that picture off of a Cecil County web site.

Mr. GILCHREST. Oh, you did? That is interesting. So when you go and testify before the county commissioners in Cecil County, you may want to ask them about that.

Ms. SANFORD-CRANE. They make a little nest, and people probably think they are beaver nests, because they have flat things with grass on top. But they are nutria. They might not know that that is what they have.

Mr. GILCHREST. That must mean that we have them in Kent County, if you have them in Cecil County.

Ms. SANFORD-CRANE. Probably.

Mr. GILCHREST. How about Pocomoke, any sign of nutria down in Worcester County that you know of?

That is good.

Cecil County, Chris and Jamie—I have the wrong schools. I guess we have the wrong—Sarah and Charlotte, you mentioned raising standards for perk tests before you build homes. I am sure that is a problem on the lower shore as well.

Do you know how you might do that, who you would listen to to raise the standards? Whose suggestions? What should the standards be raised to?

Ms. LUCS-HAJI. Well, first of all, they shouldn't test them in the summer, because the water—I mean, the soil is the driest of all.

Mr. GILCHREST. Very good.

Ms. LUCS-HAJI. And that is when a lot of perk tests are done. And a lot of it is unrecorded. A contractor might come out to your house and say, "Let's do a perk test." it is in the summer. OK, it is minimal. It goes through. And then they probably just say, "OK we can put a sewer system in here." it is not recorded. A lot of this is not recorded. And so I think we should have the perk tests recorded and done maybe in the spring.

Mr. GILCHREST. So you say that when a contractor or someone—I think the person that does—when a contractor comes out to do a perk test to determine whether or not it is suitable to put in a septic tank, it is not recorded by the public works department in Cecil County or the planning office in Cecil County?

Ms. LUCS-HAJI. See, her septic system—

Ms. SANFORD-CRANE. I have a lot of experience because we moved out here. And we moved to a nice little waterfront property, and it was so beautiful. And we got in, and the septic backed up. And we found out that back in the 1970s, in the summer after a 4-year drought, they did a perk test. They put in the septic system and left it at that. And it wasn't really meant to be that way. And we asked around and found that a lot of our neighbors had the same problem.

When you are on the waterfront as close as we are, the soil is not very good. So our whole county we really needs septic help.

Mr. GILCHREST. You probably should have had the Cecil Whig come up and listen to your testimony. That is a newspaper in Cecil County. I would like to encourage you and your teachers to give

this testimony to a number of groups in Cecil County. Whether it is the Cecil Whig, the county commissioners, and even towns and communities where they have the town council and the mayor. Because I think the kind of information that you have presented to us today is the kind of information that should be widely disseminated and widely understood.

You spoke a little bit of invasive species, and I am just curious to know what you think of the proposal to introduce Asian oysters to the Chesapeake Bay to act as a filtering system for the water and to help buttress or increase the oyster industry for economic purposes and if you have had any discussions on the Asian oyster versus the native oyster. Would anybody care to comment on that? The gentleman from the back.

Mr. HUSFELT. I am Brandon Husfelt. I am from Elkton. But I go to Bohemia.

And I believe there would not be a problem with that as long as the Asian oysters would not adversely affect the Chesapeake Bay—the native. I mean, if it could be like a strengthening thing, it probably would be a very good thing to help get toxins and stuff out of the Bay and then really clarify some of the water and stuff.

With the natural oysters declining, you would have—you need a substitute, something to take their place, or they won't live long.

Mr. GILCHREST. That is very good, Brandon. I think you have your finger on the pulse of the problem.

Ms. LUCS-HAJI. I am against it.

Mr. GILCHREST. OK. All right. Sarah.

Ms. LUCS-HAJI. Just because—I am not against the watermen. I know this is their job, and this is, you know—but I think they have overfished the oysters. And this is a problem. And this is a quick fix. The Asian oyster is just going to come in, and it is taking over the native species' job. But it is just a quick fix. It is going to be another creature to exploit.

I don't think the watermen—this is their job. I don't think they are really thinking about the actual bay's health, because the Asian oyster will help and filter, but this is the Bay's health. I think the oysters should be left alone and at least try to be repopulated. That is all I have.

Mr. GILCHREST. That is very good. Those are the kind of issues—what you just presented to us this afternoon, when we have hearings, we bring in people that we know have opposite opinions on all of these issues. And they come in and discuss and debate those issues right at the same table where you are talking about it right now.

So when we deal with—I do want to clarify that the Chesapeake Bay gets a lot of Federal money, but for the most part, the regulatory environmental issues of the Chesapeake Bay are the purview or the jurisdiction of the State of Maryland or the State of Virginia. It is not Federal water. It is all State water.

So if the State of Maryland wants to introduce Asian oysters, basically the State of Maryland can introduce Asian oysters or the State of Virginia. Where the Federal Government has the hook, generally speaking, both of those States, besides needing certain kinds of permits, need money to do that because they do not have the resources to do it widespread. So they come to the Federal Gov-

ernment through various agencies for help. Whether it is the Corps of Engineers, Fish and Wildlife Service, EPA and so on.

Since they have come to us, in a small way, then we are a part of the research to determine whether or not these Asian, non-native oysters will be good for the Bay or whether they will eventually be classified as an invasive.

I do want to say that apples are not native to North America, but they are not invasive. They have been pretty good for us. And honey bees, I understand, are not native to North America. But honey bees are good. So we just want to make sure there is enough understanding and research before these things are introduced slowly so that we can follow that.

There is no cure for that yet, native oysters live to be about 3 years old, and then they die. It is a process that we are very interested in, and we are working with the Secretary of the DNR, a man named Ron Franks and we are working with another fellow named Mike Slattery in DNR and some other people to try to do the right thing.

We are not hurrying. Some people—I do have to tell you, some people in the State of Maryland DNR want to hurry up, but I think the overall view is that we ought to pursue this in a reasonable way.

Ms. MASON. I am Amber Mason from Pocomoke High School. I just want to say, the only problem with the oysters, the Asian oysters, is that they are resistant to a strain of bacteria that exists in the Chesapeake Bay. Therefore, there are no natural predators that are going to kill off those oysters. Therefore, they do become invasive. Rather than investing our money in bringing in what could become invasive species, we should invest the money in a cure for this bacteria so that our native oysters can re-flourish in the Bay.

Mr. GILCHREST. Very good comment.

Somebody else that had a comment?

Ms. LINES. I have spoken with Tom Horton and Don Baugh with the Bay Foundation, and they talked about the oyster restoration plan that we have been trying to do with our native oysters. And they said, initially, they thought that was not working when they built the reefs, but what they found—they were just checking the oysters on the outside of the reefs that they are building and putting shells in and putting new spat out—that the oysters on the outside were not doing well. But if they went inside, they found out that they were doing really well.

And I wonder in maybe we shouldn't investigate more building reefs up from old shells, seeing if the native oyster could not do better in the reef setup where the internal ones seem to be resistant to the diseases.

Mr. GILCHREST. We will follow up on that this afternoon.

Moving on to some of the problems down in the Pocomoke, poultry, large poultry farms on small acres that we have been working with up here, along with a number of other States, to come up with a better management—nutrient management plan. And I am just curious, especially the two students here from Pocomoke High School. Have you visited or do you know much about the pelletizing plant that Perdue has built just inside the Delaware line?

Ms. LEVIN. No.

Mr. GILCHREST. Jim Perdue—and you mentioned it in your testimony, which was on target, taking some of that manure and putting it—I don't know if you used the word pellets or pelletizing it or similar to that.

Ms. LEVIN. Turn them into pellets.

Mr. GILCHREST. So you can determine the amount of nitrogen and phosphorus in that amount of pelletized manure, and you would be able to distribute that on the land in a much more managed fashion so that the corn and the soybeans would take it up instead of leaching into the ground and the water, washing it away.

Jim Perdue has built a large pelletizing plant just inside Delaware. And what he is trying to do, since most of the grain that the poultry farmers use comes from the Midwest—they use all the grain on the Eastern Shore and still have to import it from the Midwest, nutrients from Iowa, Indiana and places like that. What they want to do is ship the pellets back. We get the corn, but they do not leave behind the nitrogen and phosphorus. We send it back to them, and they use it on their fields to fertilize their plants.

You also mentioned something about gypsum being used. Can you tell us a little bit more about the process that gypsum might play in nutrient management for agriculture?

Mr. GLADDING. I am Tommy Gladding from Pocomoke. Gypsum is a combustion byproduct formed when coal is burned. It is extremely cheap. When EMES conducted its studies, they only needed to pay the truck to bring it, and the companies are giving it away. And they found in the studies that gypsum impairs the vertical movement of phosphorus.

The problem is that there is so much phosphorus in the soil that it would last 25 more years if we did not add any more. And the plants cannot use it, and it leaches in the ground and gets in the water and, in some places, the water table, 6 inches below the crop surface. So it does not have to go far before it is in the water. It does not alleviate the problem, but it keeps moving, so they do not need to add more. They can use up what is in the soil now.

Mr. GILCHREST. So the concentration of phosphorus that is in the soil now will be there for another 25 years means that you do not have to add phosphorus.

Mr. GLADDING. There is plenty now, and so we just keep it from getting in the water. And the plants can use it.

Mr. GILCHREST. So the gypsum would help it from moving and would aid in plant uptake as well?

Mr. GLADDING. I am not sure if it is gypsum or another one of the chemicals that they were using, but the plants can get it out of the soil relatively easily. I think they might have said that adding something like that to the soil, and it will help plant intake. They can get it out of the soil relatively easily. They just have so much there already; there is no need to bring in more manure.

Mr. GILCHREST. Very good. Thank you very much. Pocomoke also mentioned a problem with—you have sewage treatment plant problems, septic tank problems generally. Do you have any issues at all similar to what Cecil County had with perk tests before you

construct a house? Have you heard anything like that down in Worcester County?

Ms. LINES. The Pocumoke watershed is not growing as fast as other areas in Worcester County like Ocean Pines and Ocean City. Almost all of the land near the river is agriculture or swamp. So I don't think the perk is an issue yet.

Mr. GILCHREST. I see. Right. You mentioned—the Pocumoke students mentioned the various streams and ditches that flow into the Pocumoke River that carry rain. Problems with nitrogen, do you have any recommendations? The ditches were put there to drain the fields so you could farm. And you are apparently keenly aware of the economic importance of agriculture because you have mentioned that a number of times. Ditches, however, do bring nutrients to those fields as they are drained into the Pocumoke River to further—I hate to say it—degrade the Pocumoke River.

Are there any—do you have any recommendations on what farmers could do with the ditches?

Ms. LEVIN. The idea would be that drainage ponds that allow the nutrients to settle or allow you to be able to remove them however way you need to. You can dredge it, and then find somewhere that needs the soil, even though that is expensive. But you could also plant plants that use those nutrients around the pond or in the pond.

Mr. GILCHREST. So have a sediment pond near the ditches? That is a good idea. Good idea.

You also mentioned that word that was so prominent a few years ago, Pfiesteria, the mystery disease. People were even talking about it up here from all over the country.

It was very controversial at the time as far as, is there such a thing as Pfiesteria? Does it actually have a toxic stage in its life cycle? Could it really affect people? Is it caused by large numbers of fish, menhaden in particular? All those things.

From your perspective, in your research and living in Worcester County around the Pocumoke River, do you have a sense that Dr. Burkholder from North Carolina was correct when he said that phosphorus on farm fields getting into the water is what caused the outbreak of Pfiesteria?

Mr. NUGENT. I think that had something to do with it. Like we said, all the algae that will grow from the extra nutrients will help feed the Pfiesteria. And so I think it had something to do with it. I don't think it was all that, but I do think it had a big part in it.

Ms. LEVIN. Also, Pfiesteria can thrive in a river that has phosphorus in it.

Mr. GILCHREST. Do you have a sense that most people recognize that? Is there any sense that you have, including in Cecil County, that agriculture has improved over the last 5 years or so with some of the things that you have discussed as far as buffer zones, crop rotation, better nutrient management plan? Do you think that agriculture is better today than it was 5, 10 years ago?

Ms. SANFORD-CRANE. I think it really has in Cecil County. I live on a farm, a small one, and one of our members also lives on a farm. Last year, we went to a large dairy farm called Mount Ararat, and they were a prime example of people using best

management practices. And we toured their whole farm. And I know cows, and they are messy, but their farm was amazing. They had everything the right way. The farmers are trying hard. They always get a bad rap. They are dumping pollution in the Bay and the fertilizer. But the majority of it comes from the suburban families that do not care. The farmers seem to really try hard to make sure that they fit with the Bay.

Mr. GILCHREST. Very good.

A gentleman in the back who had his hand up. What was your name again?

Mr. HUSFELT. Brandon Husfelt. The agriculture has really improved in Cecil County over the last 5 years, because there has been many best management practices implemented, like no-till farming. There is—

Ms. LUCS-HAJI. On a curve, the contour.

Mr. HUSFELT. There is contour farming. Water, one way where there is like a ditch. You could put grass in it there to slow the water down and trap some of the dirt and sediment and stuff. That really helps a lot with runoff.

Mr. GILCHREST. So we are making progress?

Mr. HUSFELT. Yes.

Mr. GILCHREST. We have to keep the pressure up, though, to make that progress.

We have in statute—that means in law—a pilot project for the Delmarva peninsula. It is called the Delmarva Conservation Corridor. We are working with the U.S. Department of Agriculture and the States to help improve markets for agriculture, so the farmers can make money, but also use conservation dollars to put in a lot of these buffers and waterways, forested areas. That is the conservation part, to hold on to the ecological integrity of the Delmarva peninsula. And the kind of things that you are talking about here this morning are really right up that alley.

Do you have—oh, on June the 14th, we are having a hearing like this on the pilot project, the Conservation Corridor on the Delmarva peninsula at Salisbury State College. And we will have witnesses from all over the watershed talking about agriculture, water quality, septic tanks, perk tests and those kinds of things.

So if you have an opportunity, it is the 14th of June. I think it will probably start at 10:00 and probably will go to some time late afternoon if you have an opportunity to come down. And we will be discussing the same kinds of things.

Does anyone feel—you mentioned, both the schools, that much of your area is becoming too urbanized or too developed. Worcester County talked about Ocean City and, to some extent, Berlin and a place called Ocean Pines. And Cecil County is developing fairly quickly in a number of areas, not as fast as Delaware, but if you drive up from—if you drive east from your school, you see a wall of houses on the Delaware line.

Ms. LUCS-HAJI. Yes, that is true.

Mr. GILCHREST. Do you have any comment? Any comment about development trends in your area?

Ms. LUCS-HAJI. There is a lot of zoning meetings—for the paper, like community forums with zoning. And I know that my mother and a couple of other people have gone to a lot of the Cecil County

forums for urban sprawl and have voted out a lot of the zonings that have said industrial or—industrial zonings.

Delaware, I think, has enough like gridlock on a lot of the urban sprawl. I guess some of the delegates feel that they want to let their land, their agricultural land urbanize and populate. But the land is very valuable around the Bay. And Milltown is right down south of Chesapeake City, and that has totally—it has gone from maybe 15,000 to maybe 5,000 more in maybe a year. And these are a lot of new houses that have just added to the problem.

Ms. SANFORD-CRANE. Yes, we have been having a lot of meetings because the farmers want to sell their land. Right now, land is very expensive. Everybody wants to move to Cecil County. I don't know why, but they do. The farmers are selling their lands.

However Maryland has a law that states how many houses can be built in how many acres. I do not remember all of the rules about them, but if you have a 20-acre farm, you can only build five houses, and each house has to have an acre of land. You can't subdivide into tiny places.

But the Cecil County farmers have been lobbying to get rid of this rule, because they want to sell the land into lots of tiny houses that people are willing to buy and give them even more money for it. I don't think any of them have been disregarded yet. I think these laws are still in place, but it is hanging on there barely.

Mr. GILCHREST. Do you have any sense that your local officials are aware of the kinds of ecological discussions that you have raised here today?

Ms. LUCS-HAJI. There is a new Happy Harry's right across from our farm. And we did not need it. It is another problem we have.

Mr. GILCHREST. So you are saying that maybe the local elected officials or the people who decide or determine land use in your area, do you think they are as sensitive to these—

Ms. LUCS-HAJI. No, I do not think they are.

Mr. GILCHREST. OK. That is a pretty straight forward answer.

Comment from Pocomoke?

Ms. LEVIN. I don't think you should overdevelop the land. You have to think about how we are talking about watersheds and problems. And if you develop, you are going to create more problems that won't just be agriculture, like for us, poultry. It will be maybe more sewage and more chemicals, maybe. Stuff that people just dump. And it will just kind of shift the problem.

Mr. GILCHREST. You all seem to have a sensitivity to these issues and a passion for these issues and knowledge about these issues. There is an old saying that knowledge is power, but I like to think of that saying from a more democratic perspective which is: Knowledge is influence. So the kind of knowledge that you have, you can influence people by passing that knowledge along to those people who make decisions.

How do you think you can be a part of that influencing process now with the kind of knowledge you have accumulated over the last many month or years? How best can you participate in the political process or the local process to have enough people understand what you now seem to know, to help with the watershed, to have an understanding of the hydrologic cycle is what

moves a lot of these toxins? What do you think you can do to further your knowledge and curiosity?

Yes?

Ms. MASON. I think that our Discovery Center in Pocomoke for one, the Delmarva Discovery Center could have a really big impact on the community. But us being teenagers in the high school, if we show a passion for it and we get other people involved in it and have hands on activities and different things to do where kids are learning and not realizing it, where they do not look at it as a classroom but a new perspective, I think they will gain a better knowledge of what exactly the problems are and how they can be fixed. And I think they will put a better hand in the community. And not only that, but they will get their parents involved in the community better, completely rather than just in the school systems. Because I think that residential areas need more knowledge, too, not just students.

Mr. GILCREST. Very good. I think some of the new developments outside of Berlin are already experiencing severe problems with flooding every time it rains a quarter of an inch because there was not enough planning that went into these new developments.

There is a group in Worcester County called Friends of the Nassawongo River. They meet in Furnace Town every once in a while, and they might want to hear—not that I want to overwork you so that you do not have any summer vacation, but there is a farmer in Cecil County named Bill Kilby who works very aggressively to deal with these land use issues.

Do you have any other suggestions or comments or any questions you want to ask us?

Ms. LUCS-HAJI. What is being done about urban sprawl?

Mr. GILCREST. You know, that is an excellent question. I wish I could take this gavel and had the influence or power to say, no more urban sprawl. But in our system of government, and that is an excellent question, in our system of government, land use, 90 percent of the time, is a local issue.

Ms. LUCS-HAJI. Local?

Mr. GILCREST. Is a local issue. It is only a county issue, but Elkton cannot be told by Cecil County what they can or cannot do or Perryville or Russellville or Rising Sun. All of those places—or Ocean Pines or Berlin or Pocomoke itself—they have the purview or the jurisdiction, the authority to determine land use in that political division.

Now, the county pretty much takes care of anything that is not incorporated in that community. But the county government can determine the land use, which means they can determine, you can have 20 houses on 20 acres or a thousand houses on 20 acres. That is determined by the local government.

What we do at the Federal level, we pass sweeping laws, like the Clean Water Act or the Clean Air Act, those kind of things that provide, for the most part, a minimum standard as far as the air is concerned, the water is concerned.

But a number of you mentioned that DNR does not have enough people. The EPA, for the whole country, does not always have the kinds of resources and people to test everybody's well, to test the

outfall of a sewage treatment plant, to make a determination of a septic tank. And almost all septic tanks do not hold on to nitrogen.

So what are we doing about urban sprawl? We try to use our influence as much as possible. For example, on the Eastern Shore of Maryland, you have a lot of farms. And there is a Federal program, a State program, and some counties have a farmland protection program. What we do here is to appropriate millions of dollars—sounds like a lot, but when you spread it all over the country, it is a minimal amount—we send Maryland every year a number of dollars to mix with their ag programs in rural areas so that you can purchase the easements of farms, the development rights. The farmer gets the advantage of keeping the farm, getting a big chunk of money, and it protects the area from being urbanized or suburbanized. If we can hold on to enough farms and find markets for those farmers, the farmers can continue to make money, and they will keep their farms. And open space will be available.

So what are we doing about urban sprawl? And we have to get into the heart and mind of local elected officials and the planning commission, who helps really determine land use, and then the county commissioners agree or disagree with it, with the kind of information that you gave to us this morning. Communicating and trying to influence people.

So if you could get to the Worcester county commissioners, Cecil County commissioners and expand programs that already exist there, it would be very, very, very helpful.

Yes, sir?

Mr. BRITAIN. I am Daniel Britain, and this is going to sound different from what we have talked about today. I think one of the problems is the rhetoric we are using. When we say "Save the Bay," it creates an impersonal response to people who never see the Bay. I think we need a slogan like "saving ourselves," because the Bay will be there when we are not.

So I think we need to turn it into more of a structured local response, so a person in western Maryland will see how their actions affect the rest of the Bay instead of "Save the Bay." "Save the Bay, this is what we need to do and this is how it affects the Bay," rather than just "Save the Bay."

Mr. GILCHREST. It is an excellent idea. I hope maybe—each town and each county needs someone to be the intellectual/spiritual leader for that community. Enlighten your neighbors.

I want to thank all of you for coming. This has been just a wonderful experience for us. And I would like to help you take this another step beyond a school project, which was the foundation for the information that you can accumulated, to an interesting curiosity to testify in Washington to help you continue to work to save our Pocomoke and to save our northeast Sassafras. I live near the Sassafras. I have a special feel for the Sassafras river as well. We want to take this all over the watershed, but particularly in your two areas, you did a fine job.

I want to thank the teachers and your families for being patient and especially the students for your dedication. The hearing is adjourned.

[Whereupon, at 1:25 p.m., the Subcommittee was adjourned.]

