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CHESAPEAKE BAY RESTORATION: STATUS REPORT AND RECOMMENDATIONS

HEARING

BEFORE THE

SUBCOMMITTEE ON WATER AND WILDLIFE

OF THE

COMMITTEE ON
ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

APRIL 20, 2009—ANNAPOLIS, MD

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CHESAPEAKE BAY RESTORATION: STATUS REPORT AND RECOMMENDATIONS

MONDAY, APRIL 20, 2009

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON WATER AND WILDLIFE,
Annapolis, Maryland.

The subcommittee met at 10:12 a.m., in the Joint Committee Hearing Room, Maryland Legislative Services Building, 90 State Circle, Annapolis, Maryland, Hon. Benjamin L. Cardin (chairman of the subcommittee) presiding.

Present: Senator Cardin.

OPENING STATEMENT OF SENATOR BENJAMIN L. CARDIN, U.S. SENATOR FROM THE STATE OF MARYLAND

Senator CARDIN. First, let me welcome you all to this hearing of the Water and Wildlife Subcommittee of the Environment and Public Works Committee.

It is a pleasure to be here in Annapolis for a field hearing. It is very appropriate, I think, that this hearing take place in Annapolis because it does bring back for me the days when Harry Hughes was Governor, and the concept of developing a multi-State approach to dealing with the Chesapeake Bay, partnerships between government and the private sector, was initiated. At the time, I was the speaker of the State legislature, so it's nice to be back here at this Joint Hearing Room where we held so many meetings to develop a strategy to improve the Chesapeake Bay. And at that time, we developed a partnership, recognizing that we could not do it alone. And thanks to the work that was done over 30 years ago now, the Chesapeake Bay is better today than it would have been.

I know we are going to have a hearing that will bring out a lot of the challenges we have in the Chesapeake Bay and that the health of the bay today is not what it needs to be. But if the leadership was not displayed with Governor Hughes and others back 20-some years ago, I hate to think of what condition the bay would be in today. So we have made progress, but we have a lot more that needs to be done, and I am pleased that we can conduct this hearing in Annapolis where much of the early work was done on developing a strategy to clean up the Chesapeake Bay.

I also want to acknowledge that Senator Boxer, the chairman of the Environment and Public Works Committee, and Senator Inhofe and Senator Crapo, the ranking member of the Water and Wildlife Committee, are all very much interested in the Chesapeake Bay and have encouraged me to conduct hearings as we look for strate-

gies on a reauthorization of the EPA's Chesapeake Bay Program under section 117 of the Clean Water Act. That is our objective.

The Chesapeake Bay United Nations Ramsar Convention recognizes it as an ecological region of global significance. It has been called the national treasure by Presidents from Ronald Reagan to Barack Obama. It is critical to Maryland's economy, to our environment, to our culture, and our history.

It is in trouble—the Chesapeake Bay today. The University of Maryland's Center for Environmental Science—the ecological health of the Chesapeake Bay, they say, remains poor. There is excess nitrogen, phosphorus, and sediments entering the waters of the Chesapeake Bay. The main sources are from agriculture, urban and suburban runoff, wastewater from treatment plants, and contaminated airborne pollutants.

The Chesapeake Bay represents a model for estuary programs nationwide and how to curb pollution from Casco Bay in Maine to the San Francisco estuaries in California.

I think, the model for success must include three major elements, a focus on the entire watershed, not just the bay itself, but the rivers and streams in the watershed itself.

No. 2, you must engage all of the key shareholders, stakeholders, the Federal Government, the States, the local governments, the private sector. And I know we will be hearing from Will Baker later from the Chesapeake Bay Foundation. But those partnerships are critically important if we are going to have a successful effort on behalf of the Chesapeake Bay.

And it must be based on sound science. The lab works that are being done today need to be supported, and we need to base our policy on good science.

Well, the challenges that we have for the Chesapeake Bay. In the last 25 years, we have seen the population of the bay region increase from 12 million to 17 million. That extra 5 million has a major impact on the challenges of the bay. The impervious surfaces that funnel the polluted water into the Chesapeake Bay have increased by 100 percent over that 25-year period. It is estimated that we are losing about 100 acres of forest land a day in the Chesapeake Bay watershed.

The good news is that there is a willingness to take action. I think the stakeholders understand that we need to take the efforts to a new level, that maintaining or holding the status quo is not an acceptable option on the Chesapeake Bay. We need to do much, much more. And we need to look at all of the sources of pollution from agriculture—the farm bill that I know my colleagues here had a lot to do with, particularly Congressman Sarbanes in the House. The Chesapeake conservation funding to reduce the nitrogens in the farm bill is critically important. But is it enough?

In regards to runoff, what can we expect from our cities and towns to do to control that source of pollution? From our air, the nitrogen oxides that produce excess nitrogen pollution in the bay. Are current planned programs to reduce air pollutants enough?

And wastewater treatment plants, a source of excess nitrogens and phosphorus pollution. Do permit requirements need to be based on the limits of technology? Should they apply to every sewage treatment plant in the watershed regardless of size or location?

It is not just pollutants. We also need to deal with how we manage our resources. We know that we have a challenge with the oyster and crabs. For example, are we taking too many menhadens out of the bay to turn into fish oil, dietary supplements, thereby losing their natural filtering capacity in the process?

Well, these are some of the questions I hope that we will have a chance to talk about at today's hearing. Today's hearing is to try to fill in the information we need in order to draft the proper legislation. I intend to introduce legislation later this year reauthorizing the Chesapeake Bay. What should be included in that legislation? I hope this hearing will help us fill in that process.

I am very pleased that two of my colleagues from the House of Representatives are with me today. I want to first welcome Representative Gerry Connolly from Virginia. He will be on our second panel, but it is nice to have our colleague from Virginia with us today. And, of course, John Sarbanes, my colleague from the State of Maryland from the third congressional district is also with me today.

With that, let me first turn to Congressman Sarbanes for an opening statement. Then I'll recognize Congressman Connolly.

[The prepared statement of Senator Cardin follows:]

STATEMENT OF HON. BENJAMIN L. CARDIN, U.S. SENATOR FROM THE STATE OF MARYLAND

This hearing of the Subcommittee on Water and Wildlife of the Committee on Environment and Public Works will come to order.

Today's hearing will focus on the health of the Chesapeake Bay, the status of the restoration effort, and recommendations about what can be done to accelerate progress. We will hear from two panels of witnesses.

This will be the first in a series of hearings I intend to hold as the subcommittee prepares legislation to reauthorize the Environmental Protection Agency's Chesapeake Bay Program under Section 117 of the Clean Water Act.

The United Nations' Ramsar Convention recognizes the Chesapeake as an ecological region of global significance. The Bay has been called a "National Treasure" by American Presidents ranging from Ronald Reagan to Barack Obama. In Maryland, it is the economic, environmental, cultural and historic heart of the State.

The Chesapeake Bay is also in trouble.

A recent report from the University of Maryland Center for Environmental Science finds that the ecological health of the Chesapeake Bay remains poor. The Chesapeake Bay and its tributaries are unhealthy primarily because of pollution from excess nitrogen, phosphorus and sediment entering the water.

The main sources of these pollutants are

- agriculture,
- urban and suburban runoff,
- wastewater from sewage treatment plants, and
- airborne contaminants.

The Bay continues to have poor water quality, degraded habitats and low populations of many species of fish and shellfish.

What is to be done?

We must first recognize that the Chesapeake Bay Program has played a critical role in stemming the tide of pollution. The Bay Program is a model for the National Estuaries Programs that are helping curb pollution from Casco Bay in Maine to San Francisco Estuary in California.

Any success that these programs have had is because, like the Chesapeake Bay Program,

- they focus on the entire watershed,
- they involve all the key stakeholders, and
- they are based on sound science.

The population of the Chesapeake Bay Watershed has grown from 12 million when the Program started 25 years ago to over 17 million residents today. That's a 40 percent increase. And it is not just more people producing more pollution.

The amounts of impervious surfaces, the hardened landscapes that funnel polluted water into our streams and rivers and eventually the Bay, have increased by about 100 percent over the same timeframe.

We are losing an astounding 100 acres of forest lands every day in the Bay watershed.

Simply put, there are millions more of us, and the size of our impact on the Bay watershed has grown twice as fast as our population rate. Without the Bay Program, the health of the Chesapeake would undoubtedly be worse than it is.

But barely holding our own is not good enough. And so merely fine tuning the Bay Program will not be good enough either. We need some significant changes if we want significant improvements. And we do.

Everywhere I go there is a strong desire to see the Chesapeake restored. People are ready to take action to control pollution, restore water quality and see the living resources of the Bay return in abundance.

Much of the pollution to the Bay still comes from our agricultural lands. Are the major increases in Chesapeake conservation funding that we wrote into the Farm Bill going to be sufficient to dramatically reduce nitrogen, phosphorus and sediment pollution from farms? Will additional efforts be required as well?

Every day, polluted water runs off our streets and roof tops. Polluted stormwater runoff is not the largest part of the problem, but it is the only source sector of pollution that is still growing. What can cities and towns do to control this growing problem, and how can they pay for it?

Nitrogen oxides from air pollution are washed out of our skies daily, showering the Bay Watershed with excess nitrogen pollution.

Are planned programs to reduce air pollution stringent enough to curb this hidden source of nutrient pollution to the Bay?

Wastewater treatment plants are an obvious source of the excess nitrogen and phosphorus pollution that is fouling the Bay. Do permit requirements need to be based on the limits of technology? Should they apply to every sewage treatment plant in the watershed, regardless of size or location?

Pollution alone is not the problem. We don't have enough blue crabs and native oysters, in part because we haven't managed our fisheries very well.

For example, are we taking too many menhaden out of the Bay to turn them into fish oil dietary supplements, thereby losing their natural filtering capacity in the process?

Do we have enough forage fish to keep our rockfish abundant and healthy? Does the Bay Program need to have a formal fisheries management component to it?

Today we will start to examine the key issues facing the Bay. More importantly, we will start to examine ways to reinvigorate the Bay restoration effort.

Later this year I will be introducing reauthorization legislation. All of our panel members share a vision of a healthy Chesapeake, supporting diverse and abundant life in its waters and wetlands.

I look forward to hearing from our distinguished panelists today on what steps EPA can take and this Congress can take to make that vision a reality.

STATEMENT OF HON. JOHN SARBANES, U.S. REPRESENTATIVE FROM THE STATE OF MARYLAND

Mr. SARBANES. Thank you very much, Senator Cardin. Thank you for the invitation to participate in the hearing.

We are at a crossroads with the Chesapeake Bay, of course. We are always really at a crossroads, but the opportunities presented now are particularly exciting.

As I was driving here today, it occurred to me that, growing up, when it rained—and you were not too happy because it rained out your baseball game or something—you were told, well, it is a good thing because it makes the flowers grow and the trees grow. And you sort of took that to heart. Now I find when I am driving in the rain, there is a part of me that cringing because I am thinking about the water rolling off the blacktop or from the fields and pouring into the tributaries across the watershed and the negative impact that that is having, as long as we do not achieve some of the goals that we continue to lay out but seem unable to attain.

So this is a very, very important hearing. I thank you for convening it.

We are very excited, of course, at Chuck Fox's new role at EPA. There could not be a better person. I look forward to his testimony.

Senator Cardin and I were with the new EPA Administrator the other day at Fort Meade who declared with pride that science is back, and science will certainly undergird all of the work that we are going to do to try to improve the health of the Chesapeake Bay going forward.

What is exciting now, in particular, is the level of information that is available to us about the sources of pollution is really drilling down to a new level which not only is important for the scientists and the experts to give us guidance, but it gives citizens the opportunity to participate by taking ownership of the watershed in their own back yards, which I think is the ultimate solution to the bay's troubles.

I am very much in support of the concept you mentioned, which is creating this mutuality of understanding across the watershed, particularly among public policymakers, and we are trying to design right now a card we can give to every Member of Congress—Jerry will be one of them—who have got tributaries that flow into the watershed so they can understand the impairments that exist in their own district with respect to rivers and streams and begin to fully appreciate how what happens in their district impacts on the health of the entire Chesapeake Bay. That is how we are going to turn the corner on this.

And the citizen participation that is going to happen is really going to be led by the next generation, by our young people who can take up these causes with a fervor that is hard for us to manage sometimes. And I want to thank Will Baker for his leadership on environmental education and working with me closely on the No Child Left Inside effort.

The bay will be clean when the 17 million residents of the watershed who have bad habits tip the balance by developing good habits with respect to the environment, and hearings like this and participation of the citizenry going forward are going to make the difference.

I thank you very much for the opportunity to participate.

Senator CARDIN. Thank you again. I am glad you mentioned No Child Left Inside. Of course, Congressman Sarbanes has been the leader on that issue, and it is, I think, a critically important part, education, in dealing with the Chesapeake Bay. So I congratulate you on that.

Now, Congressman Connolly, we are going to have an opportunity to hear from you later, but I'd be glad to give you a moment.

STATEMENT OF HON. GERALD E. CONNOLLY, U.S. REPRESENTATIVE FROM THE STATE OF VIRGINIA

Mr. CONNOLLY. Well, thank you, Mr. Chairman. I just want to thank you for your leadership. Having this hearing I think is terribly important. I am going to be talking a little bit later about the whole issue of impervious surface, but the relationship between land use and what is happening in the bay I think is just critical. As someone who has just spent the last 14 years of his life in local

government, I know there are things we can do, and let me just give you one example that is not in my testimony.

One of the last things I had a chance to do before I came to Congress as chairman of Fairfax County was put together a 3-year task force on Tysons Corner. Tysons Corner is bigger than all of downtown Boston. It is the largest retail and commercial office market on the east coast between Manhattan and Atlanta. 80 percent of the stormwater in Tysons is untreated. We have 46 million square feet of stuff on the ground and 41 million square feet of surface parking space. And we can change that. The plan we are coming up with Tysons will change that such that there will be 100 percent of all stormwater treated, and we are going to significantly reduce that impervious surface.

So there are things we can do as policymakers in local government especially that can make a big difference in trying to turn around some of the concerns we have with respect to the bay.

Again, I thank you for your leadership, Mr. Chairman.

[The prepared statement of Representative Connolly follows:]

Presentation to Senate Committee on Environment and Public Works

Annapolis Field Hearing

Congressman Gerald E. Connolly, VA-11

April 20th, 2009

Thank you, Chairman Cardin, for convening this field hearing. As you know, despite investing billions of dollars in sewage treatment plant upgrades the health of the Chesapeake Bay has failed to improve. Although we have witnessed some recovery of subaquatic vegetation, oysters and fisheries have continued to decline. Despite laudable achievements in sewage treatment plant upgrades and combined sewage overflow capacity enhancements, and unprecedented investments in conservation through the 2008 Farm Bill, it is clear that we must reduce impervious surface areas in the Chesapeake Bay watershed in order to reach overall Bay restoration objectives.

Between 1990 and 2000, population in the Bay watershed grew 8%, while impervious surface area grew 41% and covered an additional 250,000 acres in our region. According to the Woods Hole Research Center, 'developed area' in the Bay watershed increased 61% from 1990 to 2000. Those impervious surfaces increased the volumes of nitrogen and phosphorus entering the Bay, while wreaking havoc on stream channels and causing increased erosion and sedimentation. As documented by the Chesapeake Bay Program and the Woods Hole Research Center, the increase in impervious surface area is a major contributor to sediment and nutrient loading in the Bay. The Chesapeake Bay Foundation summarizes these findings in its citizens' guide to stormwater management: "While runoff from farms is decreasing with improved agricultural practices, urban runoff is increasing as more forest and agricultural land is developed." I would encourage the Committee to address impervious surface areas and stormwater management in forthcoming authorization legislation, because without aggressive legislative action growing expanses of pavement in suburban regions of the Bay will continue to offset our achievements in reducing pollutants from point sources and agriculture.

I represent parts of Fairfax and Prince William Counties, the two most populous jurisdictions in Virginia. These counties have grown dramatically over the past 50 years, and are predominantly suburban in character. Prior to the 1970's, there were no requirements for stormwater detention or treatment. Our older neighborhoods, particularly in Fairfax and southern Prince William, have storm drains that lead directly to streams. This method of stormwater management—get it off site as quickly as possible—has destroyed stream channels in older neighborhoods throughout Fairfax County. Streams such as Holmes Run, Pimmit Run, and Accotink Creek are severely channelized, and erosion of their streambanks has resulted in increased volumes of sediment being transported both to local ponds and the Chesapeake Bay.

In the 1970's and 1980's, the state and Fairfax County began to require stormwater detention for new development. Typically developers built stormwater detention ponds that are sometimes

known as "BMPs." While these grassy ponds detain some stormwater, they do little to remove nitrogen or phosphorus from runoff, and do not sufficiently account for the increasing impervious surface areas that they are supposed to mitigate.

Prior to my election to Congress, I served as a district Supervisor and as Chairman of the Fairfax County Board of Supervisors. I was elected to Supervisor in 1995 and Chairman in 2003. In my race for Chairman, I pledged to enact an aggressive environmental agenda that would address, among other subject areas, stormwater management and stream health. Prior to my election, there was no source of dedicated funding for stormwater management or watershed restoration. During my first term as Chairman, I initiated a successful effort to dedicate a penny's value on the real estate tax rate to stormwater management. This revenue stream generated $17 to $23 million annually, and for the first time enabled the County to take some corrective actions to infiltrate stormwater and repair damaged streams.

We used that penny to fund a baseline stream health assessment for the County's watersheds. Not surprisingly, we found that stream health in older neighborhoods was very poor. Streams located in watersheds with impervious surface areas in excess of 10% suffer from poor health of benthic macroinvertebrates and poor diversity of fish species. These local findings echo Chesapeake Bay Program findings that imperviousness in excess of 10-15% is causes significant problems in terms of nutrient loading, sedimentation, and altered hydrologic performance of streams. Benthic macroinvertebrates like stoneflies, caddisflies, and crayfish are excellent indicators of stream health. Some benthic macroinvertebrates are highly sensitive to factors such as chemical pollution, sedimentation, and water temperatures, whereas others are more tolerant of these disturbances. Similarly, some species of fish, such as trout, are highly sensitive to stream temperature, pollution, and sedimentation. The last known native trout perished in Fairfax County streams sometime in the early 1990's, due to sediment loads and increased stream temperatures resulting from increasing impervious cover.

Fairfax streams with high levels of imperviousness, ranging from 15-40% of the watershed, have very poor fish diversity and few of the benthic macroinvertebrates that generally form the foundation of the stream's food pyramid. In contrast, streams such as Kane Creek on Mason Neck, which has almost no impervious cover, have maintained high levels of benthic macroinvertebrate and fish species diversity. We have seen that there is a spectrum of stream health, from undisturbed areas on Mason Neck to very low density rural watersheds in the Occoquan watershed to highly impervious areas inside the Beltway. An examination of the stream baseline data suggests that there is a strong negative correlation between impervious surface cover and stream health.

Following completion of the stream baseline assessment, we used the penny fund to pay for watershed management plans for all 30 watersheds in Fairfax County. These plans identified the projects that would be necessary to return the streams to good health, with projects ranging from rain gardens to regional stormwater management ponds. These watershed management plans have proven to be very useful because they demonstrate just how much damage has been done and precisely what level of investment would be necessary to restore our streams' health. Using the resources from the

penny fund, we have funded numerous water quality restoration projects identified in the watershed management plans. For example, in Fiscal Year 2008 the County completed fourteen projects to infiltrate or detain stormwater, including construction of a green roof, rain gardens, infiltration trenches, and a major stormwater management pond. We also used that funding to plant vegetation in existing stormwater management ponds, which reduces the amount of nitrogen and phosphorus entering the Bay. In the same year, we completed 2,085 linear feet of streambank and riparian buffer restoration.

In addition to using a dedicated revenue stream to assess and restore watersheds, we enhanced the County's stormwater management regulations. In Fairfax, the Public Facilities Manual (PFM) establishes minimum criteria for new development. In order to reduce stormwater runoff, the County revised the PFM by creating stricter "adequate outfall" requirements. Adequate outfall refers to the volume of stormwater leaving a site during a storm. By lowering the maximum volumes of stormwater runoff that is acceptable, we required developers to either reduce impervious surface area or enhance on-site detention.

The Board of Supervisors also amended the Public Facilities Manual (PFM) to allow for the use of Low Impact Development techniques (LIDs) in new construction. Since we amended the PFM to allow LIDs, developers have incorporated rain gardens, tree box filters, green roofs, infiltration trenches, pervious pavement, and other LIDs in projects throughout the County. These LIDs dramatically reduce the volume of stormwater entering our streams and the Bay, and play an important role reducing the volume of nitrogen, phosphorus, and sediments that are preventing the Bay from recovering. Using revenue from the dedicated penny fund, County staff studied the efficacy of these LID techniques and found that green roofs and rain gardens can infiltrate in excess of a one inch of rain, which represents a significant storm.

When I left the Board of Supervisors in January of 2009 to come to Congress, we were working on adoption of a Comprehensive Plan amendment for Tysons Corner. With over 1,600 acres, Tysons Corner is larger than downtown Boston. If overlaid on Washington DC, it would stretch from Georgetown to the Anacostia River. Because most of Tysons Corner was developed prior to stormwater management regulations, 70% of it has no stormwater management. As a result, streams such as Old Courthouse Branch and Scotts Run are nearly devoid of life, and have suffered severe streambank erosion. Fortunately, we have a plan to restore these waterways. Following three and one half years of deliberation, a task force composed of citizens, landowners, developers, and affordable housing advocates recommended a set of Comprehensive Plan amendments that included restoring hydrology at Tysons Corner to pre-development forested conditions. This aggressive goal had the support of environmentalists and developer representatives on the Tysons Task Force. If adopted by the Board of Supervisors, it will set a new standard for stormwater management and watershed restoration. This is an important local example because it demonstrates that restoration of our streams, and ultimately the Bay, is compatible with continued economic growth in our region. Tysons Corner is the economic engine of Fairfax County and Northern Virginia. In the region, it trails only Washington DC as an employment center. The fact that the President of the Chamber of Commerce and the environmental community concurred on the stormwater elements of the proposed Comprehensive Plan amendment

demonstrates that restoration of the Bay is compatible with continued prosperity and economic growth, including in suburban and exurban regions.

The key is that continued growth has new standards for stormwater management. Our standards for new development and for transportation infrastructure are insufficient to protect the Bay. I would encourage the Committee to pursue rigorous new standards for stormwater management that will provide a regulatory framework within which local governments can reduce impervious surface areas. Our objective should be to maintain or return to pre-development forested hydrology, just as Fairfax County is doing in Tysons Corner. Because of resource constraints made more acute by the housing crisis, this regulatory framework should not come as an unfunded mandate. However, properly structured and funded it could serve as the critical enabling legislation to achieve, at long last, our shared objectives for Bay restoration.

I appreciate the opportunity to testify today and look forward to working with the Committee as it prepares Chesapeake Bay authorization legislation. I share your desire to restore the health of the Bay and offer my full assistance in advocating for these objectives in the House of Representatives.

Environment and Public Works Committee Hearing
April 20, 2009
Follow-Up Questions for Written Submission

Questions for Connolly

Questions from:

Senator Barbara Boxer

1. In your testimony, you highlighted the cost-effective measures local communities can take to reduce stormwater runoff, which according to EPA's most recent status report on the Chesapeake Bay, is the fastest growing threat to Bay water quality. What improvements to existing Federal programs could be made to provide incentives and funding for measures to address urban stormwater runoff?

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May 18, 2009

The Honorable Barbara Boxer
Member, U.S. Senate
Attn: Heather Majors
410 Dirksen Senate Office Building
Washington, DC 20510

Dear Senator Boxer,

Thank you for submitting a question following the recent Environment and Public Works field hearing on the Chesapeake Bay. The most important thing the federal government can do is to establish consistent standards for stormwater management, which should be based on maintaining pre-development hydrology of land that is being developed, measured by total and peak volume of surface runoff. Consistent standards for the whole Bay watershed are important so that localities do not risk putting themselves at a competitive disadvantage by adopting more stringent requirements than a neighboring jurisdiction. Secondarily, the federal government should establish detailed guidance on what Low Impact Development (LIDs) techniques can achieve stormwater management standards. Although some localities in the watershed have implemented some LIDs, others may be unfamiliar with these stormwater management systems and could benefit from a best practices manual. Finally, the federal government should establish a new subset of grants for local governments to use when constructing LIDs. Although consistent stormwater management standards would ensure that LIDs are incorporated in new development, a robust grant program would be necessary to help localities build LIDs as retrofits for existing impervious surface areas. Thank you again for your commitment to protecting the Chesapeake Bay, and please let me know if I can ever be of assistance to your Committee.

Sincerely,

Gerald E. Connolly
Member of Congress
11th District, Virginia

GC/ZF

PRINTED ON RECYCLED PAPER

Senator CARDIN. Well, thank you very much.

Without objection, opening statements from members of the committee—the record will be open to include those opening statements. In addition, the entire written statements of our witnesses will be included in the record, and they may proceed as they see fit.

We will have two panels. Our first panel will be Charles Fox, Chuck Fox, who is the Senior Advisor to the Administrator for Chesapeake Bay and the Anacostia River, U.S. Environmental Protection Agency. We take great pride in Chuck assuming that new position. He has a distinguished record as a champion of the bay restoration and water issues. He served as Secretary of Maryland's Department of Natural Resources, as well as Assistant Administrator of the EPA's Water Division during the Clinton administration. Chuck, it is a pleasure to have you.

STATEMENT OF J. CHARLES FOX, SENIOR ADVISOR TO THE ADMINISTRATOR FOR CHESAPEAKE BAY AND THE ANACOSTIA RIVER, U.S. ENVIRONMENTAL PROTECTION AGENCY

Mr. FOX. Thank you, Mr. Chairman.

You cannot come to this hearing room and not reflect upon some of the past. My first experience in this hearing room was, in fact, under your leadership as the speaker of the House. I think my colleague, Will Baker, and I were testifying on the phosphate detergent ban, and I think it is a classic example of had we not taken those actions, today we would be far worse off than we are. A lot of that is because of your early leadership. So thank you very much.

My name is Charles Fox. I am a senior advisor to Administrator Lisa Jackson at the U.S. Environmental Protection Agency. And we really appreciate the opportunity to discuss EPA's emerging new leadership to restore and protect Chesapeake Bay and its watershed. We are working very closely with our Federal and State partners to define what we hope will be bold, new ways of strengthening the management, performance, and accountability of the Chesapeake Bay Program.

Administrator Jackson outlined her vision and priorities to the agency in a recent memo to all EPA staff. She described President Obama's three core values for our agency. No. 1, science must be the backbone for our programs. No. 2, EPA must follow the rule of law, and No. 3, EPA's actions must be transparent. These guiding principles apply to the agency's work broadly, as well as our work here in the Chesapeake Bay.

Administrator Jackson's memo also highlighted five priorities that would receive her personal attention. She described one of her priorities to intensify our work to restore and protect the quality of the Nation's waters. She stated in particular that the agency will make strong use of our authorities to restore threatened treasures such as the Chesapeake Bay and the Great Lakes.

A little over a month ago, I began my service as the Administrator's Senior Advisor on the Chesapeake Bay and Anacostia River. I am both excited and, I must admit, daunted by the opportunity to work with all the bay partners and Members of Congress to find ways to address the challenges confronting the bay and its people.

The Chesapeake is a national treasure. While we are mindful of our accomplishments over the past 25 years, we are also intensely focused on how to improve our work to have greater success in the future. We are committed to change and to provide the leadership necessary to improve the performance and accountability of the Chesapeake Bay Program. We cannot pledge that the bay's health will improve dramatically in the next several years. However, we can and do pledge to provide the leadership that will be responsive to the conclusions of scientists, to our obligations under Federal law, and to the desires of the region's community.

Last month, the Chesapeake Bay Program issued its annual assessment of the health of the Chesapeake Bay, also referred to as the "Bay Barometer." A copy of the executive summary has been provided to the chair and to the members of the subcommittee. The Bay Barometer affirms what we all know: despite the longstanding commitment by the array of partners, the health of the bay and the watershed remains severely degraded. Virtually all of the 13 specific measures show very limited progress. The one striking exception is the restoration of the population of striped bass. This success is attributed to the bold action by Maryland, Virginia, and other east coast States to limit harvest pressure years ago. At the same time, it is worth noting that this population has been stressed in recent years by high instances of mycobacteriosis.

The recent health assessment describes some important but not yet sufficient progress to reduce nutrient pollution from agriculture and wastewater treatment plants. Agriculture remains the single largest source of nutrient and sediment pollution to the bay, with about half of the nutrient load directly related to animal manure. However, the report also shows that pollution from urban and suburban stormwater is actually increasing.

This negative trend is directly linked to the rise in population in the watershed. Since 1950, the number of residents has doubled. Projections through 2030 show continued population growth and continued increases in sprawling urban and suburban development. From 1990 to 2000, the amount of impervious surfaces, such as roads and rooftops, increased by 41 percent, even though the population only rose by 8 percent.

Congress reauthorized section 117 of the Federal Clean Water Act in 2000. This section expired in 2005. It formally authorized the Chesapeake Bay Program and the landmark agreement that was adopted in 2000 by the Federal Government and our State and local partners. But as we all know, the key goals of that 2000 agreement are not going to be achieved. Sadly, the bay program is actually not even close to achieving most of the key goals of the 2000 agreement.

Improving water quality remains the fundamental challenge for EPA and our partners. This challenge, in turn, is defined more precisely as reducing runoff pollution from urban, suburban, and agricultural lands. Presently we have a range of tools that we are implementing to tackle these problems. However, the range of existing tools may not be enough to get the job done.

EPA and our partners will want to better focus our existing regulatory authorities and other tools to improve performance and accountability. However, we also must consider new tools to improve

the health of the Chesapeake. We look forward to working with this subcommittee and other Members of Congress to explore these issues in the months ahead. Reauthorizing section 117 presents all of us with a unique opportunity to redefine our future.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Fox follows:]

TESTIMONY OF J. CHARLES FOX
SENIOR ADVISOR TO ADMINISTRATOR LISA JACKSON
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
WATER AND WILDLIFE SUBCOMMITTEE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
U.S. SENATE

April 20, 2009

Senator Cardin and Members of the Subcommittee, I am J. Charles Fox, Senior Advisor to Administrator Lisa Jackson at the U.S. Environmental Protection Agency (EPA). Thank you for the opportunity to discuss EPA's new leadership approach to restore and protect the Chesapeake Bay and its watershed, and for holding this hearing on America's national treasure. As stated in the Chesapeake Bay Program "Report to Congress", which was provided in July, 2008, EPA is closely working closely with the Departments of Interior (USFWS, USGS, NPS), Agriculture (NRCS, ARS, USFS), Defense, and Commerce (NOAA) to have a shared-leadership approach to strengthen the management, coordination, and accountability of the Chesapeake Bay Program.

Guiding Principles and Priorities of the Obama and Jackson Administration

After being confirmed as President Barack Obama's Administrator for the EPA, Lisa Jackson provided her vision and priorities for the Agency in a memo dated January 23, 2009 to all EPA staff. In that memo, she first reiterated President Obama's three values for his agenda on the environment: 1) Science must be the backbone for

EPA programs; 2) EPA must follow the rule of law; and 3) EPA's actions must be transparent. These guiding principles apply to the Agency's work broadly as well as to our efforts on the Chesapeake Bay.

Administrator Jackson also highlighted five priorities that would receive her personal attention. She described one of her priorities as EPA's intent to intensify our work to restore and protect the quality of the nation's streams, rivers, lakes, bays, oceans and aquifers. She stated that the Agency will make strong use of our authorities to restore threatened treasures such as the Chesapeake Bay and the Great Lakes.

Other priorities of Administrator Jackson which are related to the Chesapeake Bay include: the impacts of climate change on our nation's water resources; improving air quality which can lead to reductions of nitrogen oxide emissions that contribute to over 20% of the nitrogen contributions to the Bay; and cleaning up hazardous-waste sites which can also contribute to localized water quality issues throughout the watershed.

The Role of the Senior Advisor

On March 11, 2009 the Administrator announced that I would serve as her Senior Advisor on the Chesapeake Bay and Anacostia restoration and protection efforts. I am excited about the opportunity to work with all of the Bay partners and Members of

Congress to find ways to do more in addressing the challenges confronting the Bay and its watershed.

The Chesapeake Bay is a national treasure. We are mindful of our accomplishments over the last 25 years, but intensely focused on how to improve our work to have greater success in the future. EPA is committed to change, and to provide the leadership necessary to improve the performance and accountability of the Chesapeake Bay Program. We cannot pledge that the Bay's health will improve dramatically in the next several years. However, we can and do pledge to provide the leadership that will be responsive to the conclusions of scientists, to our obligations under federal law, and to the desires of the region's communities.

When asking me to serve, the Administrator stressed her desire to connect our communities to the Bay and its rivers – to improve our economies and our quality of life. The Anacostia River is a vital resource to the people of this region and symbolic of challenges we confront in all urban areas -- where the vast majority of our citizens reside. A healthy Chesapeake Bay is the result of healthy rivers and streams throughout the entire watershed. The Anacostia River is a great urban river with tremendous grass roots support from the Anacostia Watershed Society and the Anacostia Watershed Partnership, and others mobilizing local residents and local resources to improve the river. Our hope is that we can support local action that is

successful in restoring the vitality of the Anacostia River and secure similar success in urban rivers throughout the watershed.

My role and emphasis as Senior Advisor to the Administrator is to help define new ways forward to meet our shared goals for the Chesapeake Bay, the Anacostia River and urban rivers throughout the watershed. Put simply based on the sources that need to be controlled, we need to improve the performance and accountability of EPA and the partnership.

The Scope and Complexity of the Watershed and Bay

The Chesapeake Bay watershed encompasses 64,000 square miles, parts of six States and the District of Columbia. Nearly 17 million people live in the watershed. The land mass of the Bay watershed is sixteen times the size of the Bay, a ratio higher than any other estuary in the world. This means that our actions on the land have a profound impact on our local streams, rivers and, ultimately the Bay.

The Chesapeake Bay is the largest estuary in North America and is ecologically, economically and culturally critical to the region and the country and, as North America's largest and most biologically diverse ecosystem. It is home to more than 3,600 species of fish, plants and animals. For more than 300 years, the Bay and its tributaries have sustained the region's economy and defined its traditions and culture.

The economic value of the Bay is estimated at more than $1 trillion[1] and two of the five largest Atlantic ports (Baltimore and Norfolk) are located in the Bay.

<u>The Chesapeake Bay Program and Partnership</u>

This past year, the Chesapeake Bay Program and partnership celebrated its 25-year anniversary. There is much to be proud of in what has been accomplished. A few examples are illustrative of the accomplishments of this partnership:

- **Unparalled research and monitoring programs and an improved understanding of this complex ecosystem;**
- **Comprehensive and specific goals and outcomes designed to 1) Protect and restore fisheries; 2) Protect and restore vital aquatic habitats;, 3) Protect and restore water quality; 4) Maintain healthy watersheds; 5) Foster Chesapeake Stewardship; and, 6) Enhance Partnership and Accountability;**
- **Significant technical and financial commitments by Federal, State, local and other partners;**
- **Independent advice and counsel by three Advisory Committees (Citizens, Local Government, Scientific and Technical);**
- **Demonstrable examples of restoration progress such as:**

[1] *Saving a National Treasure: Financing the Cleanup of the Chesapeake Bay*, A Report to the Chesapeake Bay Executive Council, Chesapeake Bay Blue Ribbon Finance Panel, October 27, 2004

- A shared Federal, state, and local commitment to invest and upgrade 483 municipal and private wastewater facilities to achieve nutrient removal which will all be required to have a permit by the end of 2010;

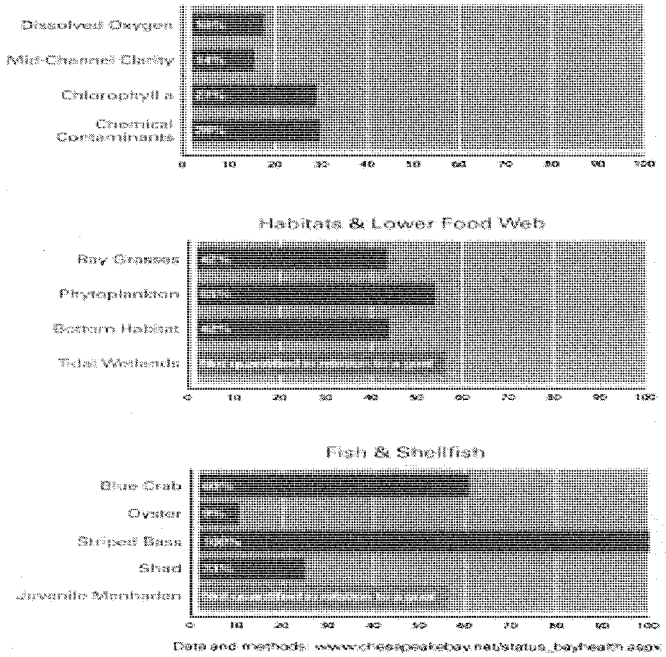
- implemented a watershed-wide phosphate detergent ban;
- Planted more than 6,000 miles of streamside forests,
- restored more than 13,000 acres of wetlands;
- preserved more than 1 million acres of forests, wetlands, farmland and other resource lands; and
- Removed blockages to over 2,000 miles of historic spawning grounds for shad and other migratory fish; and implemented significant harvest restrictions to restore a previously collapsed striped bass fishery.

The Health of the Bay

In March 2009, the Bay Program issued its annual Health and Restoration Assessment of the Chesapeake Bay and Watershed, also referred to as the 'Bay Barometer'. A copy of the Executive Summary has been provided to the Chair and members of the Committee.

The Bay Barometer affirms what we all know. Despite the impressive restoration work done by the array of partners, the health of the Bay and watershed remains severely degraded. The data included in this report are sobering. Virtually all

of the 13 measures which comprise Bay Health show very limited progress (water quality, habitats and lower food web and fish and shellfish) (see Figure 1). There have been positive improvements in the population of striped bass, which is generally attributed to the actions by Maryland, Virginia and other east coast states to limit harvest pressure years ago, although this population has been stressed in recent years by a high incidence of mycobacteriosis.



In general, the Bay Program partners have made some important – but not sufficient -- progress to reduce nutrient pollution from agriculture and wastewater treatment plants. Agriculture is the single largest source of nutrient and sediment pollution to the Bay, with about half of that load directly related to animal manure. However, the pollution from urban and suburban stormwater is actually increasing.

The negative trend in nutrient and sediment pollution from stormwater is directly linked to the rise in population of the watershed. Since 1950, the number of residents has doubled. Projections through 2030 show continued population growth, loss of natural areas and increases in urban development. People are moving into sprawling suburbs and living in bigger houses on larger lots, causing forests, farms and other valuable lands to be transformed into subdivisions, shopping centers and parking lots. Impervious surfaces, such as roads and rooftops, increased by 41% compared to an 8% increase in population growth from 1990-2000. Impervious surfaces do not allow water to filter into the ground. Instead, rainfall runs off, picking up pollution and quickly carrying it into waterways.

Other Sources and Issues in the Chesapeake Watershed

The priority emphasis of implementation will remain on improving water quality throughout the watershed, as well as making progress on the full spectrum of health and ecosystem measures. It will remain important for the Program partners to

develop enhanced understanding of and, as appropriate, respond to other issues and stressors in the Chesapeake watershed, including for example:

- The contribution of nutrient and pathogen pollution from onsite wastewater systems and septic tanks;
- The contribution of nutrients and sediments from historic dams (i.e., legacy sediments);
- The potential impact of sediments behind Conowingo Dam, in the event of a major storm;
- The role of endocrine disruptors and pharmaceuticals that are released through various wastewater treatment systems;
- Continued investigation of the source(s) of intersex fish and fish kills in the Shenandoah and Potomac;
- The impacts of agricultural production on nutrient loads and impacts on water quality and ;
- The impact of the atmospheric deposition of nitrogen.

To improve our understanding of these issues, EPA and its partners are continuing to conduct critical research on topics including endocrine-disrupting chemicals and best management practices to control runoff. Further, EPA is initiating new research to address needs such as better understanding how ecosystem services in rivers and estuaries are impaired by excess nitrogen from increased agriculture production and other watershed activities.

Chesapeake Bay Program Reauthorization

The challenge we all confront is how to improve our performance and accountability to achieve the goals that we all share for the future of the Chesapeake Bay and its tributaries.

The Clean Water Act, Section 117, the Chesapeake Bay, was last authorized in 2000. It expired in 2005. This action by Congress was helpful in supporting the Chesapeake Bay Program and the Agreement adopted by the partners in 2000 as a matter of federal law. But as we know now, the 2010 goals of that Agreement are not going to be achieved.

The fundamental challenge for the Bay's water quality is reducing runoff pollution from urban, suburban and agricultural lands. Presently, we have a range of tools that we are implementing to tackle these problems. However, the range of existing tools may not be enough to get the job done. EPA and our partners will want to better focus our existing regulatory authorities and other tools and consider adopting new tools to improve the health of the Chesapeake and its tributaries. We look forward to working with this Subcommittee and other Members of Congress to explore these issues in the months ahead. A reauthorization of the Chesapeake Bay Program presents all of us with a unique opportunity to redefine our future, and we are very appreciative of the Subcommittee's leadership in this regard.

Closing

The Chesapeake Bay Program has many attributes that make it unique: world class science; comprehensive environmental data, measures and outcomes; and superior partnerships among Federal, State local, private and non-governmental organization partners.

Across the landscape there have been important actions over the past 25 years - by farmers to implement nutrient management practices and install buffer strips and fences; by homeowners to reduce energy consumption and runoff pollution; by localities to upgrade wastewater treatment plants and to reduce stormwater pollution; by developers to implement sediment and erosion control plans and implement smart growth practices; by states to expand land conservation and strengthen their water quality protection programs. However these good efforts are simply not sufficient.

The straightforward conclusion is that the Chesapeake Bay ecosystem remains severely degraded, despite the concerted efforts by many for more than 25 years. However, all of these challenging conclusions are tempered by a strong sense of optimism we all share for the future. Scientists today can describe with a high degree of precision what we need to do to save the Bay and its tributaries. Our region's elected officials are engaged like never before. At EPA, we have a dynamic new

Administrator who is willing to provide the leadership necessary to improve our environment for the benefit of the Bay and communities throughout the country.

Thank you again Senator Cardin, and Members of the Subcommittee, for the opportunity to appear before you today. In the coming months, it is our hope that you will be hearing more from us and our Bay Program partners about ways to improve the use of various tools to enhance the Chesapeake Bay's environmental quality.

July 6, 2009

EPA ANSWERS TO QUESTIONS FOR THE RECORD
SENATE ENVIRONMENT AND PUBLIC WORKS COMMITTEE
HEARING ON CHESAPEAKE BAY
APRIL 20, 2009

Questions from Senator Barbara Boxer:

Question: What more can EPA do to address the impacts of CAFOs on the water quality of the Chesapeake Bay?

Answer: The EPA can make full use of our authorities under the Clean Water Act, specifically the new 2008 rule for concentrated animal feeding operations (CAFO). EPA can work with the States to ensure that all CAFOs that discharge or propose to discharge apply for a CAFO permit. EPA is developing a Chesapeake Bay compliance and enforcement strategy that will help ensure compliance with the CAFO rule. We can also continue to target the most effective agricultural conservation practices in areas that contribute the greatest nutrient load to the tidal Chesapeake Bay. But more actions may be needed to restore the Bay, as about half of the agricultural nutrient pollution load stems from animal operations.

In the absence of animal feeding operations that have a permit EPA is analyzing ways of addressing environmental/human health impacts from discharges of animal waste. EPA has several statutory provisions which authorize the Agency to take action to prevent or address harm to the public and the environment from pollution coming from these sources. These provisions include, but are not limited to:

- Safe Drinking Water Act Section 1431 which authorizes EPA to address endangerments to human health posed by contaminants present in or likely to enter a public water system or underground drinking water source.

- Resource Conservation Recovery Act Section 7003 which authorizes EPA to issue orders or seek injunction against any person if any solid waste or hazardous waste may present imminent and substantial endangerment to human health and the environment. In the Agency's view if animal waste is being over applied it ceases to be a fertilizer and can become a solid waste disposal practice covered by Section 7003.

- Clean Air Act Section 113, which authorizes EPA to, among other things, enforce the obligations of sources to reduce emissions as outlined in a State implementation plan, provided that a State has developed a State implementation plan that addresses emissions from CAFOs.

- Clean Air Act Section 303 which authorizes EPA to seek an injunction in Federal district court and to issue administrative orders to restrain any person from emitting air pollutants

that are causing or contributing to pollution that is presenting an imminent and substantial endangerment to public health or welfare, or the environment.

The Chesapeake Bay watershed is unlike any watershed throughout the Nation and more protection may be necessary for this national treasure, where agricultural operations tend to be densely concentrated in particular regions of the watershed that have a great influence on Bay water quality. As we work to define the next generation of tools and actions to restore water quality in the Chesapeake Bay as called for in Executive Order 13508, we are identifying actions and any changes to be made to regulations, programs, and policies to implement these actions. Examples of actions that could further protect the Bay and ensure sustainable agriculture are:

- Increase the number of animal feeding operations that are regulated under the Federal 2008 CAFO rule. More than 40 percent of all animal manure generated in the U.S. at farms that confine livestock remains unregulated under the CAFO NPDES program, based on 2003 CAFO rule estimates.

- Consider stricter requirements for any new or expanding operation so that we do not exacerbate the nutrient imbalances we are faced with from animal operations.

- Require water quality-based nutrient management plans that are phosphorus-limited and reduce current nitrogen application rates by 10 0915 percent. We need to ensure that the recommended application rates, and tools like the phosphorus site index that are used to calculate these rates, are based on sound science and are protective of water quality and do not perpetuate the problem we are facing with nutrient buildup in soils that we are seeing in many areas of the watershed where animal operations are concentrated.

- Require common sense and effective practices such as cover crops and stream fencing.

- Consider restrictions on manure application such as:

  - Requiring cover crops on cropland where manure is applied to ensure that excess nutrients are taken up before they are lost to the Bay.

  - Prohibiting manure application on no-till lands where phosphorus losses can be very high.

  - Requiring manure injection/incorporation into the soils to prevent nutrient losses from the air and surface runoff.

  - Requiring that manure be used for alternative uses other than application on agricultural lands in areas that have nutrient imbalances. For example, transport poultry litter to Perdue AgriRecycle plant where it will be pelletized and used for golf courses. The plant is not operating at full capacity and could accept another 31,000 tons of manure annually.

Question: What have been EPA's efforts since the CAFO regulation was finalized?

Answer: EPA Region 3 has been working with State environmental and agricultural agencies to update existing State CAFO regulations to adhere to the new Federal November 2008 CAFO regulation. With the exception of West Virginia, EPA is anticipating approving all other updated State programs by December 2009. West Virginia, due to new legislative provisions will need additional time to fully update its CAFO programs. EPA expects to approve the program by December 2010.

As a result of the February 2009 compliance deadline requiring all CAFOs that discharge to apply for a NPDES permit, EPA has launched an extensive outreach campaign to the poultry industry in Delaware and Maryland. Partnering with the Delmarva Poultry Industry, several town hall meetings were held to emphasize that certain design features could create a discharge and thus would require the grower to apply for a NPDES permit. The meetings resulted in a better understanding among the regulated community of how the permit rules apply to poultry growers. Presently, EPA continues to discuss with Delaware and Maryland how best to support the need to either develop or update nutrient management plans which are vital components of the NPDES CAFO permit. EPA and our Bay Program partners seek to assure that nutrient management plans are developed and implemented in a manner which maximizes benefits to water quality.

One other provision that EPA is evaluating is to use designation authority for small animal feeding operations to bring them into the NPDES permitting program. In some states there are a number of small dairy operations that fall under the medium and large definitions for a CAFO yet on a cumulative basis due to these operations being located in close proximity to each other can contribute animal manures that impact the environment. Currently, EPA is having discussions with Pennsylvania due to numerous small dairy operations located in Lancaster County.

Questions from Senator Benjamin L. Cardin:

POTWs

Question: How much of the problem is from traditional point sources like sewage treatment plants, how much is from decentralized point sources like municipal stormwater and how much from non-point sources like agriculture? How much comes from air deposition? Please provide both estimated loads for each pollutant of concern (in pounds) by source sector (e.g., agriculture) and as a percentage of total (e.g., agriculture nitrogen pollution = xx percent of problem).

Answer: Of the total nitrogen loads delivered to the tidal waters, 43 percent comes from agricultural sources, 20 percent from municipal and industrial wastewater discharge facilities, 21 percent from atmospheric deposition of mobile, utility, industrial and natural emissions (this does not include direct deposition to tidal waters nor emissions from agricultural animals and lands),

16 percent from urban and suburban runoff (which includes 5 percent from septic systems). Of the total phosphorus loads delivered to the tidal waters, 45 percent comes from agricultural sources, 21 percent from municipal and industrial wastewater discharge facilities, 31 percent from urban and suburban runoff and 3 percent from natural sources.

Question: You mentioned that we've made progress on regulating Publicly Owned Treatment Works (POTWs). Is there still room for improvement?

Answer: Yes. The vast majority of the significant municipal wastewater treatment facilities within Maryland, Virginia and the District are being permitted and upgraded to discharge at levels approaching the current limit of the available treatment technology. However, there are significant facilities in these States and the other watershed States being permitted at levels above those achievable by current treatment technologies. In this regard, EPA could consider whether additional control actions by POTWs and industrial wastewater dischargers will be necessary to achieve the water quality standards established by the States in the Chesapeake Bay and its tributaries.

It is worth noting that well-designed pollution trading programs can benefit the Region by facilitating the least cost solutions when considering all sources, point and non point. Several states have already launched trading programs. Pennsylvania and Virginia have had trading programs in place for several years and Maryland recently adopted a set of trading guidelines for implementing its own trading program. West Virginia is actively developing a trading program which is scheduled for possible adoption next year. EPA is facilitating a process to evaluate the details of an interstate trading program In addition, we are mindful that the new Bay-wide TMDL process will necessitate a re-evaluation of the relative load reduction targets for individual sources and watersheds in the basin. We are committed to managing the TMDL process in collaboration with our Chesapeake Bay Program partners.

Question: What steps could be taken on a regional level to assist treatment plants achieve greater nutrient reduction?

Answer: First and foremost, permits are being issued that provide annual limits for nitrogen and phosphorus loads, leading to greater nutrient reductions than would be designed for under weekly or monthly concentration based limits. The Blue Plains regional facility located in the District of Columbia is the best example of where this has lead to greater nutrient reductions. The basinwide approach to issuing permits for all 483 significant wastewater treatment facilities is also leading to significant technological innovations by the professional wastewater engineering community that are resulting in greater reductions at lower costs. State-based nutrient trading programs are encouraging treatment plants to design for greater nutrient reductions with the prospect for selling nutrient credits to other facilities. We expect to evaluate whether additional nutrient trading policies can be implemented throughout the watershed to improve performance at reduced costs, as part of the President's Executive Order (see Section 202(a)).

Question: What proportion of Publicly Owned Treatment Works (POTWs) in the watershed is currently permitted for Nitrogen and Phosphorus? Please provide data by State, showing number of facilities and loads.

Answer: Of the 483 significant wastewater treatment facilities across the 64,000 square mile Bay watershed, 250 have been issued permits to reduce nitrogen and phosphorus loads. The issuance of permits is being purposely staged in some States (PA in particular) to focus on the largest dischargers first for permit renewal followed by stages 2 and 3 for smaller facilities in this group. As can be seen from the chart below, over 70 percent of the total design flow is now covered by effective permits and many facilities are operating below design capacity which accounts for a great percentage of coverage of actual flows.

Each State is basing the permitted annual nitrogen and phosphorus load limits on the wastewater nitrogen and phosphorus loading caps described within their respective tributary strategy. For the permit issued to date, these annual load limits can be converted into nitrogen and phosphorus effluent concentrations as follows for each jurisdiction:

- Maryland: 4 mg/L nitrogen and 0.3 mg/L phosphorus;
- Virginia: 3-6 mg/L nitrogen and 0.3 091 mg/L phosphorus;
- Pennsylvania: 6 mg/L nitrogen and 0.8 mg/L phosphorus;
- District: 4.2 mg/L nitrogen and 0.18 mg/L phosphorus;
- Delaware: still being determined for their four facilities;
- New York: 5 mg/L nitrogen and 0.5 mg/L phosphorus; and
- West Virginia: 5 mg/L nitrogen and 0.5 mg/L phosphorus.

In Virginia, the nitrogen and phosphorus concentrations vary because more stringent permits were issued in the Potomac, Rappahannock and Virginia Eastern Shore basins compared with the York and James river basins due to differences in their relative impacts on Bay water quality.

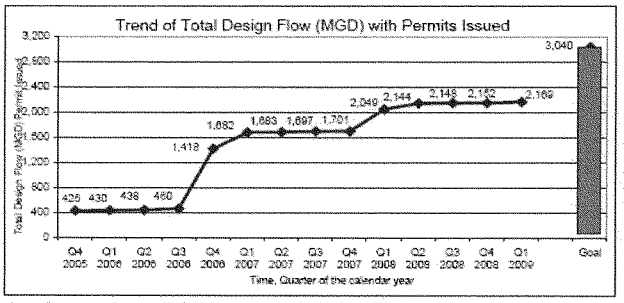
EPA expects all 483 significant facilities to have annual nitrogen and phosphorus load limits within their permits by the end of 2010. As of May 2009, 250 permits have been reviewed by EPA and issued by the States, 40 additional permits have been drafted and are under review with 193 permits remaining to be drafted and issued.

Nutrient Permit Tracking For Significant Facilities In The Bay Watershed

Nutrient Permit Tracking Summary by the First Quarter of 2009 (calendar year)

STATE	# Significant Facilities	# Facilities Permits Drafted	# Facilities Permits Issued	Design Flow of Facilities Permits Issued	% of Design Flow of Permits Issued/All Sig Plants	TN Load Permits Issued	%TN Load Permits Issued/All Sig TN load	TN (lbs/yr) Reduction From 2004 Permit Issued	% TN Load Reduction Permit Issued/All Sig Plants	TP Load Permits Issued	%TP Load Permits Issued/All Sig TP load	TP (lbs/yr) Reduction From 2004 Permit Issued	% TP Load Reduction Permit Issued/All Sig Plants
DC	1	1	1	152.5	100%	2,115,000	100%	943,079	100%	83,539	100%	-18,145	-100%
DE	4	4	3	2.8		499,287	98%	-339,581	-118%	17,319	92%	-11,698	-697%
MD	85	38	24	283.0	33%	3,273,465	32%	1,057,356	17%	190,852	27%	43,375	88%
NY	28	1	1	20.0	22%	304,656	13%	970,338	62%	30,456	9%	99,890	47%
PA	213	102	77	418.8	65%	7,648,351	81%	3,379,386	139%	1,019,790	70%	357,750	97%
VA	124	124	124	1,253.5	100%	21,791,407	100%	4,546,578	100%	1,825,075	100%	434,909	100%
WV	28	20	20	38.5	61%	568,091	80%	185,755	100%	84,661	86%	255,987	100%
Total	483	299	250	2,168.9	71%	36,198,157	72%	10,743,012	68%	3,251,782	72%	1,163,867	89%

Note: Some industrial design flows are not available or not comparable and not listed in the database, such as the DE Invista plant.
Blue Plains' flow and loads are allocated among DC, MD and VA, but is counted only once as one plant located in DC.



Note: The design flow curve has been modified due to the updates of design flows and VA permit issue dates for individual plants.

5/11/2009, CBPO

AIR

Question: How much of the nitrogen pollution in the Chesapeake comes from air sources? Does the Program have an analysis of where this pollution originates? Please provide data by State, air pollution source (including agricultural operations), and amount.

Answer: Air sources contribute nitrogen to the Chesapeake Bay by depositing directly onto the surface of the Bay and by depositing onto the watershed, a portion of which then flows into the Bay. Using year 2007 model runs, the contribution from the nitrogen deposited onto the watershed is estimated to account for 73 million pounds or 28 percent of the total loading to the Bay. Combined with the direct deposition to tidal surface waters, about 20 million pounds, air sources contribute about a third of the total nitrogen loading to the Bay.

Of the inorganic nitrogen deposited to the Chesapeake Bay watershed from air emission sources, approximately 60 percent is oxidized nitrogen due to air emissions of nitrogen oxides (NOx). The remaining 40 percent is in the form of reduced nitrogen from emissions of ammonia.

Air emissions of oxidized nitrogen (NOx) from all or portions of 14 States and DC have the greatest potential to deposit nitrogen in the Bay watershed. These States include the watershed States of: Pennsylvania, West Virginia, Virginia, Maryland, Delaware, and New York, and the District of Columbia as well as the surrounding States of Georgia South Carolina, Tennessee, Kentucky, Indiana, Michigan, Ohio and New Jersey. Portions of southeastern Canada are also included.

The States that are within the Bay watershed account for about half of the oxidized nitrogen deposition. For these States, the relative percent contribution to deposition due to NOx sources is as follows: Pennsylvania 16 percent; Virginia 15 percent; Maryland 8 percent; New York 5 percent; West Virginia 5 percent; and Delaware 1 percent. Another 25 percent of the oxidized nitrogen deposition is due to sources from the other eight States that are within the airshed. The remaining 25 percent of the oxidized nitrogen deposition to the Bay watershed is due to long-range transport of emissions from sources outside the airshed. Although this modeling is based on projected emissions for 2020, it is believed that the results are generally representative of current conditions.

In 1990, the relative contributions of different source sectors of NOx emissions to oxidized nitrogen deposition to the Bay watershed were as follows: power plants 40 percent; onroad mobile sources 30 percent; nonroad/marine/construction/residential & commercial sources 20 percent; industrial sources 8 percent; other 2 percent. Modeling estimates based on projected emissions for 2020 are: power plants 15 percent; onroad mobile sources 26 percent; nonroad/marine/construction/residential & commercial sources 33 percent; industrial sources 17 percent; other 9 percent. The EPA does not have information on the contribution of individual source sectors by State.

As noted above, 40 percent of the nitrogen deposition to the Bay watershed is in the form of reduced nitrogen from emissions of ammonia. Based on EPA's current emissions inventories, sources of ammonia include animal feeding operations, fertilizer application and onroad mobile sources. Although EPA does not have quantitative information on the contribution by State to

reduced nitrogen deposition, it expects that States within the watershed likely contribute more to reduced nitrogen deposition to the Bay than States further from the watershed. This is because much of the ammonia is believed to deposit close to its source.

Air models estimate that of the 28 percent of the total nitrogen load delivered to the Bay's tidal waters from atmospheric deposition to the watershed, 71 percent originates from mobile, utility and industrial emissions, 25 percent from agricultural animals and soil emissions, and 4 percent from natural sources—lightning and forest soils. A portion of the mobile/utility/industrial emissions and the vast majority of the agricultural emissions are ammonia. Of the remaining nitrogen loads delivered to the tidal waters, 36 percent comes from agricultural sources, 20 percent from municipal and industrial wastewater discharge facilities, 16 percent from urban and suburban runoff (which includes 5 percent from septic systems).

Question: What reductions in nitrogen deposition are expected by 2010 under existing regulatory requirements? What reductions can be expected by 2015? By 2020? What regulations are expected to provide these benefits?

Question: Is the amount of air pollution from any air source category expected to grow over the next 10 years in the watershed? If so, what sector and by how much?

Answer: The EPA has estimates of the reductions in nitrogen deposition from 2002 to 2010, 2015, and 2020, based on air modeling analyses. The future year scenarios reflect emission reductions from national control programs for both stationary and mobile sources, including the Clean Air Interstate Rule, the Tier 092 Vehicle Rule, the Nonroad Engine Rule, the Heavy-Duty Diesel Engine Rule, and the Locomotive/Marine Engine Rule. Although the Clean Air Interstate Rule has been remanded to EPA, it will remain in place pending a rulemaking to replace it. At this point, it is unclear how the replacement rule will compare to the remanded rule. However, EPA anticipates that NOx emissions reductions close to those originally projected will occur.

The modeling results and National Atmospheric Deposition Program monitoring data indicate that the amount of reduction in nitrogen deposition varies across the Chesapeake Bay watershed. These spatial variations reflect effects of declining emissions of NOx (due to control programs), which are offset in certain locations by increasing emissions of ammonia, principally due to agricultural animal populations.

In the aggregate, the overall total nitrogen deposition to the Chesapeake Bay watershed is projected to decline from 2002 levels by 20 percent by 2010, 26 percent by 2015, and 29 percent by 2020 as a result of the projected reductions in NOx and stable to increasing ammonia emissions throughout the Eastern U.S.

Question: Will additional reductions in air pollution be required to meet the water quality goals of the Bay Program? If so, does the Administration have initial suggestions about what additional reductions might be required?

Answer: When the Chesapeake Bay Program analyzed pollution reductions needed to achieve the 2010 water quality goals in the Chesapeake 2000 agreement, it estimated that the nitrogen

load to the Bay due to air emission sources would need to be reduced by an additional eight million pounds per year. EPA's Clean Air Interstate Rule is projected to result in enough reductions in emissions to make up the 8 million pounds per year, based on modeling done by the Program. Furthermore, additional reductions in loadings will be achieved by other existing Clean Air Act regulations, such as the mobile source regulations noted above.

The strategy called for in the May 12 Executive Order on Chesapeake Bay Protection and Restoration will be based on a new examination of both air and non-air inputs and programs to improve water quality. While implementing the Executive Order, EPA will consider whether options for gaining additional air pollution reductions beyond current programs would be necessary to achieve the goals set forth in the strategy.

STORMWATER

Question: What proportion of the impervious surface in the watershed is currently covered by permits?

Answer: About 66 percent of the impervious surface in the watershed is contained with MS4 areas. MS4 areas cover 17 percent of the total area of the Bay watershed.

Question: How many MS4 permits are currently in place in the watershed?

Answer: There are approximately 450 municipal MS4 permittees in the watershed (Phase I and II MS4s). There are many more non-municipal (nontraditional), including universities and colleges, hospitals, government and military facilities, and departments of transportation that add to that number, but they are often very small in land area and contained within the boundaries of the larger, municipal MS4s.

Question: Does the Program have an estimate of the pollution load coming from these sources? What are those estimates?

Answer: The estimates of percentage of the total loads of nitrogen, phosphorus and sediment coming from areas covered by MS4 permits are:

- Nitrogen (chemical fertilizer)—2 percent
- Phosphorus—6 percent
- Sediment—4 percent

The estimates of percentage of the total loads of nitrogen, phosphorus and sediment coming from urban and suburban land uses throughout the watershed:

- Nitrogen— (chemical fertilizer) 11 percent
- Phosphorus—31 percent
- Sediment—19 percent

Examples of the sources of nitrogen from urban and suburban lands include atmospheric deposition, organic litter (e.g. grass clippings, leaves, and decaying wood), organic and chemical fertilizers, pet wastes, and septic systems. Sources of phosphorus include organic and chemical

fertilizers, streambank erosion, and pet wastes. Sources of sediment include construction activities, runoff from unvegetated areas, and streambank erosion. Streambank erosion is exacerbated by the exceptionally high volumes of stormwater that are associated with significant precipitation events.

Question: What steps has EPA taken to address municipal stormwater?

Answer: EPA issued stormwater regulations in 1990 and 1999 that requires certain municipal separate storm sewer systems to obtain National Pollutant Discharge Elimination System permit coverage for their stormwater discharges. Each regulated municipal system must develop and implement a stormwater management program to reduce the contamination of stormwater runoff and prohibit illicit discharges. In addition to issuing and overseeing permits, EPA has provided guidance and conducted numerous workshops and webcasts to train states and municipalities on the various aspects of stormwater management. Additional information about the municipal stormwater program can be found at http://cfpub.epa.gov/npdes/stormwater/munic.cfm.

Question: Currently, EPA regulations stipulate that stormwater management permits require that pollution discharges are controlled to the "maximum extent practicable", without regard to water quality limitations. Is this the right standard?

Answer: Municipal stormwater permits must require that the municipal operator develop, implement, and enforce a stormwater management program designed to reduce the discharge of pollutants from a regulated system to the "Maximum Extent Practicable", to protect water quality, and satisfy the appropriate water quality requirements of the Clean Water Act. See Section 402(p)(3) of the CWA and 40 CFR 122.34, and 122.26(d)(2)(iv). In addition, Section 402(p)(3) gives permitting authorities the ability to require other provisions that the Administrator or the State determines is appropriate for the control of such pollutants. As EPA explained in its Phase 2 stormwater rule, we view this as authorizing an iterative approach toward attainment of water quality standards. See 64 FR 68,722, 68,753 (Dec. 8, 1999). The iterative process should take into account such factors as the condition of receiving waters, specific local pollution concerns, and other considerations raised by watershed studies or plans, completed total maximum daily loads (TMDLs), or other ecosystem assessments. The goal of this iterative approach is for municipal stormwater permits to meet water quality standards over time.

EPA expects that improvements to the stormwater program will be among the considerations for enhancing progress toward water quality protection.

Question: How could Congress enforce State municipal stormwater permitting compliance with a more aggressive tributary strategy such as the watershed-wide TMDL? Some have suggested a Clean Air Act-like policy that links Federal funding with compliance (i.e, in the CAA Federal transportation funding is tied to compliance with adherence to a federally approved, enforceable State Implementation Plan) would be an effective approach. Should the Federal Government link funding for Chesapeake Bay restoration to compliance with a water quality improvement program that is federally approved and enforceable?

Answer: EPA promotes watershed-based NPDES permitting under the CWA to achieve water quality standards (see: http://cfpub.epa.gov/npdes/wqbasedpermitting/wspermitting.cfm). In general, EPA's goals for watershed-based permitting under the CWA are similar to its goals for SIPs under the CAA. Both are designed to achieve standards in a timely and cost-effective manner. In addition, the ongoing Bay-wide TMDL process will produce specific information that is similar to the inventories and modeling results that form the basis of a SIP.

Question: How has population growth affected the Bay?

Answer: Population growth affects the Bay in many ways. Increased population leads to development in the watershed, often resulting in the conversion of forests and farmland into houses, stores, streets and parking lots—a large increase in impervious surfaces. The loss of forests also decreases the natural uptake of air deposited nitrogen into plant material. This leads to more polluted stormwater runoff into local streams and rivers and eventually the Chesapeake Bay. More people means higher flows of sewage for treatment at municipal wastewater facilities, leading to higher loads even with advanced treatment technologies. Additional septic systems also result from population increases, adding more nutrient loads into local groundwater, streams and rivers. With more people come more cars, streets, roads and highways, schools, stores, etc., each adding its own contribution to the pollution loads to the Bay.

SECTOR ANALYSIS

Question: What issues are preventing the Chesapeake Bay Program from achieving the objectives of the Chesapeake 2000 agreement?

Answer: The Chesapeake 2000 agreement has five broad sections containing over 100 specific goals and commitments, ranging from fisheries to public access to water quality. EPA and most of the Bay Program partners have focused on the water quality objectives of the Chesapeake 2000 agreement, and that focus is on reducing nutrient and sediment pollution to the Bay.

The four largest sources of nutrient pollution to the Bay are agriculture; wastewater treatment facilities; urban and suburban; and air. Nutrient pollution from wastewater treatment facilities accounts for approximately 20 percent of the loadings. There are 483 significant wastewater facilities in the Bay watershed and significant progress has been made on these sources—achieving 67 percent of the Chesapeake 2000 wastewater nitrogen reduction goal.

Agriculture, the largest nutrient and sediment pollution source in the watershed, has been making progress toward Chesapeake 2000 goals, but at a much slower pace than was needed. The infusion of $188 million in new funds from the Farm Bill, beginning this year, will help to accelerate progress in this source sector, but still nowhere near enough to achieve the Chesapeake 2000 goals. About one-half of the nitrogen load from agriculture is from animal manure.

Air pollution contributes approximately one-quarter to one-third of the nitrogen pollution to the Bay watershed. It is anticipated that progress will be made in further reducing nitrogen through national air programs, including the Clean Air Interstate Rule which has been remanded to EPA.

Nutrient pollution from urban and suburban sources is the only major source sector that is growing. Population growth and development, and the rapid increase in the amount of impervious surfaces, has caused stormwater pollution to be a growing concern. Only about 17 percent of the Bay watershed is covered by State/Federal stormwater permits, but that does include about 66 percent of the impervious surfaces.

PRODUCT MGM'T

Question: You noted in your testimony that several Bay states have limitations on the amount of phosphorus in detergents. By State, please provide data on what product restrictions are in place and the estimated reductions achieved by this source control method (e.g., How many states restrict laundry detergent? What standard is used? How much phosphorus pollution is avoided through this requirement?).

Answer: The Chesapeake Bay region, through the leadership of members of the Chesapeake Bay Commission, has been out front on the banning of phosphates in laundry detergent since the mid 1980s, following such an effort in the Great Lakes in the late 1970s. In 1985 Maryland banned the sale or use of phosphate laundry detergent, followed by the District of Columbia in 1986; Virginia in 1988; and Pennsylvania in 1990. All of these "bans" limit phosphorus to trace amounts in the detergent.

The ban on phosphate laundry detergents in DC, MD, NY, PA, and VA resulted in a reduction of influent phosphorus concentrations to wastewater facilities of 25 percent to 30 percent, estimated to be about 7.5 million pounds annually. In addition, the reduction of phosphorus concentrations in the wastewater facilities led to significant cost savings in operations and maintenance—estimated at $31.6 million annually watershed-wide.

While these early actions removed phosphorus from laundry detergent, dishwashing detergent was not included in the bans. Several Bay watershed States (MD, PA and VA) have recently passed a ban on phosphate dishwasher detergents, but all of those bans do not begin until July 2010. Since all 483 significant wastewater treatment facilities will have nutrient reduction technology, the phosphorus from dishwasher detergents would be removed from the loadings to the Bay after they enter the facilities. However, the smaller "non-significant" facilities will not have this technology and they account for approximately 5 percent of the point source nutrient loads. It is estimated that through these facilities, the ban on phosphate dishwasher detergent throughout the Bay watershed would remove 52,000 pounds of phosphorus currently discharged from treatment plants. The ban, however, will lead to savings for operations and maintenance costs at treatment facilities which will not have to remove as much phosphorus.

Question: The Bay Program has a voluntary agreement with some lawn fertilizer companies that limit phosphorus and/or nitrogen. Please provide the subcommittee with information on which companies are participating in this effort and the amount of phosphorus or nitrogen pollution avoided through this effort. In addition, please provide an estimate of how much of the Do-It-Yourself market is covered by these voluntary agreements. If these product content management methods were applied comprehensively

across the watershed, what is the estimated reductions in nitrogen and phosphorus pollution that could be expected across the watershed. Please provide data by State and pollutant.

Answer: In 2006, the Chesapeake Executive Council signed a MOU with two fertilizer companies—Scotts Corporation and Lebanon Seaboard Company. The MOU sought to achieve a 50 percent reduction in the pounds of phosphorus applied in lawn care products in the Chesapeake Bay watershed by 2009. It was estimated that if the entire homeowner supplier industry joined this effort, and the 50 percent goal was met, that phosphorus loads to the Bay would be reduced by an estimated 316,000 pounds annually.

EPA has not performed an independent evaluation of the MOU and its implementation. We are not in a position to verify the 2006 estimates of the potential load reductions of phosphorus.

Residential lawns, sod farms, golf courses, and playing fields are a significant source of nitrogen and phosphorus to the Chesapeake Bay and its tributaries. Recent estimates suggest that the watershed includes about the same amount of turf grass (e.g., lawns, golf courses, recreation fields), as cultivated cropland (about 9 million acres). Many of these areas receive significant fertilizer applications from both chemical and organic sources, some of which are applied by professional management companies and others by individuals in the do-it-yourself market.

Question: Do any jurisdictions (State or local governments) have mandatory product content controls for fertilizers? If so, please list the jurisdiction, product, content control requirement, and any estimates of pollution avoided through these approaches.

Answer: In January, 2009, the city of Annapolis, Maryland, became the first municipality in the Bay watershed to restrict lawn fertilizer. The ordinance bans most nonagricultural uses of fertilizers that contain phosphorus for lawns, golf courses, cemeteries and parks. It does not affect products for use on trees, gardens, shrubs or indoor plants. These restrictions within the city of Annapolis, with a population of approximately 36,000, will have a negligible impact on local waters and the Bay.

There have been State legislative proposals to restrict fertilizer content and use in the Bay watershed, with the latest effort coming in New York with Governor Paterson's introduction of a bill on March 31, 2009, to restrict both phosphate dishwater detergent, and the use of fertilizers containing phosphorus for lawns. The proposal is very similar to the city of Annapolis restrictions for fertilizer.

Question: Do any jurisdictions have product content limitations beyond those for detergents and DIY lawn fertilizer? If so, please list the jurisdiction, product, content control requirement, and any estimates of pollution avoided through these approaches.

Answer: All of the jurisdictions that have phosphate detergent bans (DC, MD, NY, PA, and VA) have also restricted the amount of phosphorus in household cleaning products, generally to no more than 8.7 percent by weight expressed as phosphorus. There are no estimates for the

relatively negligible amount of phosphorus removed by the phosphate ban for household cleaning products.

AGRICULTURE

Question: How many agricultural operations in the watershed are covered by CAFO permits?

Answer:

- DE: 122: Poultry—113, Dairy—5, Swine—1, Horse Race Tracks—3
- MD: 463: Poultry—450, Dairy—10, Swine—1, Beef—2
- PA: 295: Poultry—89, Dairy—47, Swine—149, Beef—7, Horse—1, Other—2
- VA: 115: Poultry—99, Dairy—2, Swine—8, Beef—1
- WV: estimated @ 20 poultry operations—CAFO Program under development
- NY: 88: Dairy—86, Swine—1, Sheep—1

In DE and MD the majority of poultry CAFOs have not been permitted although these operators have applied for a permit in compliance with the February 27, 2009 deadline. EPA has discussed with DE and MD utilizing Clean NMP East as the organization that can provide no cost technical support to operators to help them identify and implement nutrient management plans. Other opportunities have also been discussed with USDA and State agencies to address the lack of capacity for technical support to develop nutrient management plans as part of the overall NPDES CAFO permit. In Virginia these operations reflect permits as part of the Virginia Pollution Abatement Program, which is recognized by EPA as a comprehensive State regulatory CAFO program that has been effective in issuing State Pollution Abatement permits for livestock and poultry animal feeding operations. While EPA responded to the Waterkeeper decision, Virginia decided not to update its State program until EPA finalized its Federal CAFO regulation (November 2008). EPA has been meeting with Virginia officials in 2009 as they prepare to submit to EPA a CAFO regulatory program that will conform to EPA's final CAFO regulation. EPA anticipates approving Virginia's program by December 2009, which means that no Federal CAFO NPDES program is yet approved.

Question: How many additional agriculture animal operations are there in the watershed that are not covered by CAFO permits?

Answer:

- DE: 310 farms dominated by broiler operations
- MD: 500 (450 poultry, 50 miscellaneous estimated)
- PA: Poultry—4,958, Dairy—5,677, Swine—1,726, Beef—5,564
- VA: Poultry—3,241, Dairy Farms—680, Swine—830
- WV: Program under development

Question: What is the estimated number of animals in the watershed that are covered by CAFO permits?

Answer:

- DE: 36,334,000 chickens, dairy—xx, swine—xx, horse race tracks—xx
- MD: 57,300,000 chickens, dairy 15,785, beef 4,300, swine 3,300
- PA: 33,134,360 chickens, 33,853 dairy, 677,625 swine, 4,625 beef
- VA: 3,861,000—turkey, 10,028,800—chickens, 2,850—dairy, 29,920—swine, 2,475—beef (these fall into the large CAFO definition)
- WV: Program under development

Question: How many agriculture animals are there in the watershed that are not covered by CAFO permits?

Answer:

- DE: 86,100,000 chickens, dairy—xx, swine—xx,
- MD: 8,200,000 chickens, dairy 42,700, beef 28,300,
- PA: 9,265,588 chickens, 364,437 dairy, 323,755 swine, 70,763 beef,
- VA: 7,305,800 turkeys, 33,498,685 chickens, 12,535 dairy, 3,000 swine, 2,975 beef
- WV: Program under development

Question: What is the current state of agriculture runoff regulation in the Chesapeake Bay watershed?

Answer: At the Federal level, the most direct water quality regulatory program addressing runoff of nutrients from livestock and poultry operations is the Concentrated Animal Feeding Operation (CAFO) regulation. This new regulation for the first time requires a nutrient management plan (NMP) for manure to be submitted as part of a CAFO's Clean Water Act permit application. Manure contains nitrogen and phosphorus, which, when not managed properly on agricultural land, can pollute nearby streams, lakes, and other waters. The regulation also requires that an owner or operator of a CAFO that discharges to streams, lakes, and other waters must apply for a permit under the Clean Water Act. If a farmer designs, constructs, operates and maintains their facility such that a discharge will occur, a permit is needed. Additionally, the NMP includes a number of best management practices that reduce nutrients in the production area.

In the Chesapeake Bay watershed there are approximately 1,000 CAFOs that have either been permitted or are in the process of being permitted by State regulatory agencies. In the past EPA had reported that approximately 536 CAFOs represented the number of operations that would be permitted but with the new CAFO regulation in November 2008 an additional 460 permit applications were received based on the February 2008 compliance deadline established for operators that had a discharge but did not have a permit. The majority of these new permit applications are broiler operations in Delaware and Maryland.

Several Bay watershed States have specific regulations that address nutrient runoff. Maryland and Delaware both have Water Quality Improvement Acts that require all farmers to have and

implement a nutrient management plan. Virginia requires that many medium size confined dairy, beef, and swine farms and nearly all poultry (broilers and turkey) farms operate under the Virginia Pollution Abatement permit similar to the Federal regulation. Pennsylvania has a Nutrient Management Act that regulates 5 0910 percent of their most concentrated animal confinement operations. The Act requires conservation planning and either nitrogen or phosphorus based nutrient management. West Virginia is in the process of developing its CAFO regulation expected to be approved by EPA in 2010.

These State actions are likely to have reduced agricultural nutrient pollution significantly. However, EPA expects to review the adequacy of nutrient management planning criteria to assess whether it is sufficiently protective of water quality. We will conduct this review with our Chesapeake Bay Program partners, including extensive collaboration with scientists.

In the absence of permitting requirements for animal feeding operations, EPA is analyzing ways of addressing discharges of animal waste. EPA has several statutory provisions which authorize the Agency to prevent harm to the public and the environment from pollution coming from these sources. These provisions include, but are not limited to:

- Safe Drinking Water Act Section 1431 which authorizes EPA to address endangerments to human health posed by contaminants present in or likely to enter a public water system or underground drinking water sources;

- Resource Conservation Recovery Act Section 7003 which authorizes EPA to issue orders or seek injunction against any person if any solid waste or hazardous waste may present imminent and substantial endangerment to human health and the environment. In the Agency's view if animal wastes are being over applied they can cease to be a fertilizer and can become a solid waste disposal practice covered by Section 7003.

- Clean Air Act Section 113, which authorizes EPA to, among other things, enforce the obligations of sources to reduce emissions as outlined in a State implementation plan, provided that a State has developed a State implementation plan that addresses emissions from CAFOs.

- Clean Air Act Section 303 which authorizes EPA to seek an injunction in Federal district court and to issue administrative orders to restrain any person from emitting air pollutants that are causing or contributing to pollution that is presenting an imminent and substantial endangerment to public health or welfare or the environment.

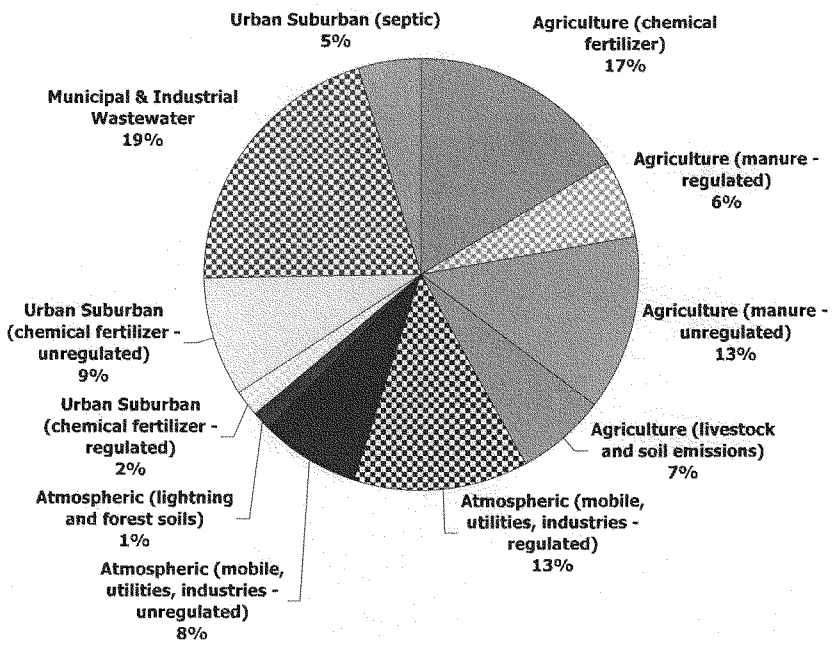
Question: How much of the agricultural nutrient problem is related to chemical fertilizer, and how much is related to animal manure/chicken litter?

Answer: Nutrient loads estimated to be delivered to the Chesapeake Bay from agricultural land uses vary by nutrient type. Of nitrogen loads to the Bay, agriculture is estimated to contribute 42 percent of the total from all sources. Inorganic nitrogen sources (chemical fertilizer) are estimated to contribute 17 percent of the total load and organic sources (manure/chicken litter)

are approximately 19 percent of the total load. Atmospheric emissions from agricultural land uses contribute an additional 7 percent.

Of phosphorus loads to the Bay, agricultural land uses provides approximately 46 percent of the total load from all sources. Inorganic phosphorus sources are estimated to contribute 19 percent of the total load, and organic sources contribute approximately 26 percent of the total load.

Sources of and Federal Regulatory Status for Delivered Loads to the Bay: Nitrogen

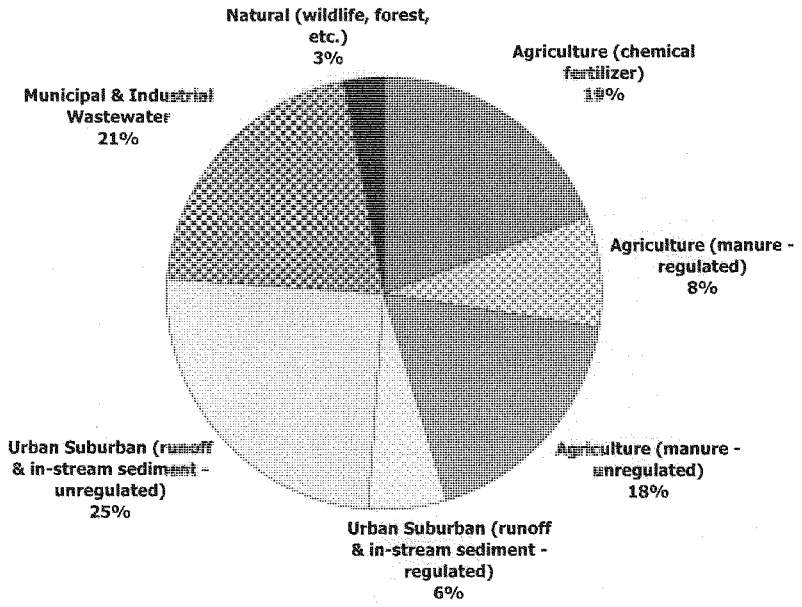


Federally regulated

60% of the total nitrogen load to the Chesapeake Bay is <u>not</u> subject to Federal regulation.

Source: Chesapeake Bay Program Phase 4.3 Watershed Model

Sources of and Federal Regulatory Status for Delivered Loads to the Bay: Phosphorus

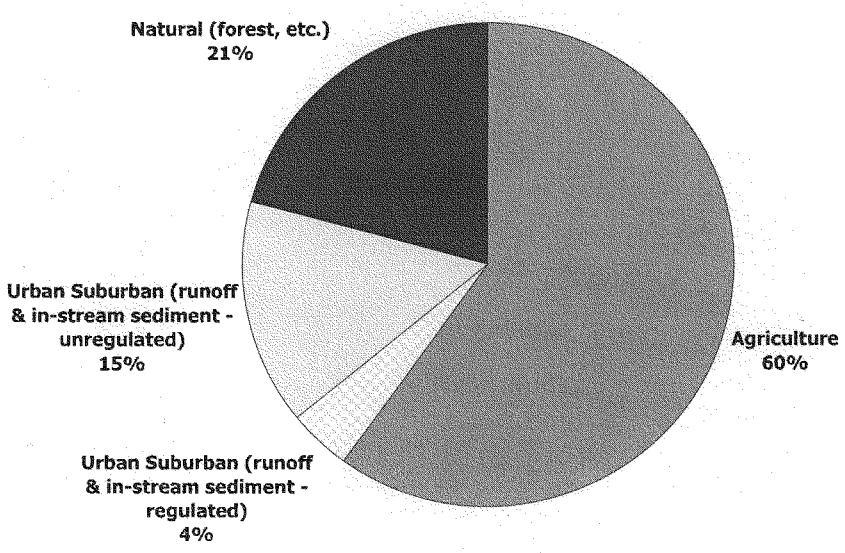


Federally regulated

65% of the total phosphorus load to the Chesapeake Bay is <u>not</u> subject to Federal regulation.

Source: Chesapeake Bay Program Phase 4.3 Watershed Model

Sources of and Federal Regulatory Status for Delivered Loads to the Bay: Sediment



Federally regulated

96% of the total sediment load to the Chesapeake Bay is <u>not</u> subject to Federal regulation.

Source: Chesapeake Bay Program Phase 4.3 Watershed Model

Question: What is "Enhanced Nutrient Management" and what results could be expected if it were implemented throughout the watershed? What other agricultural Best Management Practices have a demonstrated record of effectiveness in the watershed? Please provide estimates showing the BMP, current implementation levels, and levels needed to attain water quality goals by State. Are any of these BMPs required/enforceable by any agency of the Federal Government?

Answer: Reducing the amount of nutrients applied to the land is one of the most cost-effective ways of reducing water pollution. It is a pollution prevention technique that further enhances the effectiveness of other BMPs, such as cover crops or filter strips, which are designed to capture additional nutrients in crops, grasses, or woody vegetation.

The Chesapeake Bay Commission's report entitled Cost-Effective Strategies for the Bay published in December 2004, included Enhanced Nutrient Management (ENM) as one of six smart investments for achieving nutrient reduction goals while efficiently investing public funds. The definition of ENM utilized by the Commission in the report was based on the assumption of reducing nutrients applied to cropland by an additional 15 percent below the recommendations of traditional nutrient management plans. The 2004 estimate of nitrogen reductions achieved by implementing this practice on all row crops and hay land within the watershed was approximately 23.7 million pounds.

The definition of "Enhanced Nutrient Management" used by the Chesapeake Bay Program partnership in developing their nutrient reduction strategies is broader than the Commission's report. The practice can also represent the increased accuracy of application and management of cropland nutrients through precision agriculture techniques. To provide greater definitional unity among the partnership and create a revised estimate of water quality benefits, the Bay Program in partnership with the University of Maryland is currently hosting a professional and scientific panel of experts in the field of nutrient management. Within the next several months, the panel will more precisely define the Enhanced Nutrient Management practice and will provide science-based data for estimating the potential for reducing the loss of nutrients to the Chesapeake Bay.

Other agricultural BMPs that have a demonstrated record of effectiveness include conservation tillage, cover crops, streamside buffers, fencing livestock out of streams, and traditional nutrient management practices. These practices have been recognized by USDA Natural Resources Conservation Service (NRCS) and the partnership as core conservation practices for agriculture. However, some practices are more effective at controlling nutrients than others.

The NPDES permits issued under the Federal CAFO program requires the development and implementation of nutrient management plans and integrated agricultural conservation plans to protect water quality. The core conservation practices may be either required to meet the regulations, or may be included as elements of the plans included under the permit.

[Attached XL Spreadsheet showing estimates of BMPs, current implementation levels, and levels needed to attain water quality goals according to the State Tributary Strategies.]

Question: What measures can the Federal Government take to reduce agricultural pollution more aggressively in the Watershed and what additional legislative support is needed?

Answer: The EPA can make full use of our authorities under the Clean Water Act, specifically the new 2008 CAFO rule for concentrated animal feeding operations. EPA can work with the states to ensure that all CAFOs that discharge or propose to discharge apply for a CAFO permit. EPA is developing a Chesapeake Bay compliance and enforcement strategy that will help ensure compliance with the CAFO rule. We can also continue to target the most effective agricultural conservation practices in areas that contribute the greatest nutrient load to the tidal Chesapeake Bay. For example, the NRCS, working with EPA and USGS, identified priority watersheds to target implementation of conservation practices using funds from the 2008 farm bill. The EPA, and USGS are working to develop monitoring programs to document water-quality improvements in selected priority agricultural watersheds so NRCS can evaluate and adjust actions to take in the future. But more actions may be needed to restore the Bay.

The Chesapeake Bay watershed is unlike any other throughout the Nation and more protection may be necessary for this national treasure, where agricultural operations tend to be densely concentrated in particular regions of the watershed that have a great influence on Bay water quality.

As we work to define the next generation of tools and actions to restore water quality in the Chesapeake Bay as called for in Executive Order 13508, EPA will be identifying actions and any changes to be made to regulations, programs, and policies to implement these actions. Some ideas that are under consideration and discussion that could further protect the Bay and ensure sustainable agriculture are:

- Increase the number of animal feeding operations that are regulated under the Federal 2008 Concentrated Animal Feeding Operation (CAFO) rule and/or strengthen minimum permit standards. More than 40 percent of all animal manure generated in the U.S at farms that confine livestock remains unregulated by the CAFO NPDES program, based on 2003 CAFO rule estimate. EPA should evaluate the use of ``designating" additional small AFOs as operations that need NPDES permits based on past pollution occurrences causing fish kills/endangerment to public health (i.e., as a result of applying manure on frozen land or when the land was saturated with rainwater). There are numerous dairy operations in the watershed that on a cumulative basis, if manure is not properly managed, can cause serious water quality problems.

- Consider stricter requirements for existing, new or expanding operations so that we do not exacerbate the nutrient imbalances we are faced with from animal operations. Promote the requirement of New Source Performance Standards in the new CAFO regulation that requires new livestock and poultry operations to comport to stricter design and construction practices based on past experience to achieve zero discharge.

- Require water quality-based nutrient management plans that are phosphorus-limited and reduce current nitrogen application rates by 10 0915 percent. We need to ensure that the

recommended application rates, and tools like the phosphorus site index that are used to calculate these rates, are based on sound science and are protective of water quality and do not perpetuate the problem we are facing with nutrient buildup in soils that we are seeing in many areas of the watershed where animal operations are concentrated.

- Consider managing the offsite transfer of manure in a manner that is consistent with criteria applied to CAFOs covered under the NPDES program. Consider including minimum management criteria for the owners, distributors, and processers of animal products.

- Require common sense and effective practices such as cover crops and stream fencing.

- Consider restrictions on manure application such as:

  - Requiring cover crops on any cropland where manure is applied to ensure that any excess nutrients are taken up by cover crops before they are lost to the Bay.

  - Prohibiting manure application on no-till lands where phosphorus losses can be very high.

  - Requiring manure injection/incorporation into the soils to prevent nutrient losses from the air and surface runoff.

  - Requiring that manure be used for alternative uses other than application on agricultural lands in areas that have nutrient imbalances. For example, transport poultry litter to Perdue AgriRecycle plant where it will be pelletized and used for golf courses. The plant is not operating at full capacity and could accept another 31,000 tons of manure annually.

  - Show Federal and State leadership in procurement for replacing the use of commercial inorganic fertilizer with manure-based organic fertilizer.

GOVERNANCE

Question: Some have suggested that the Secretary of Agriculture should be a member of the Bay Program's Executive Council. What is the Administration's position on this recommendation?

Answer: The statutory authority for the Chesapeake Bay Program is Section 117 of the Clean Water Act, and membership on the Chesapeake Executive Council is defined as "the signatories to the Chesapeake Bay Agreement". The Secretary of Agriculture has not signed the Chesapeake Bay Agreement. However, Congress, in Section 2605 of the Food, Conservation and Energy Act of 2008 (The 2008 Farm Bill) included the following provision: *(g) SENSE OF CONGRESS REGARDING CHESAPEAKE BAY EXECUTIVE COUNCIL—It is the sense of Congress that the Secretary should be a member of the Chesapeake Bay Executive Council, and is authorized*

to do so under section 1(3) of the Soil Conservation and Domestic Allotment Act (16 U.S.C. 590a(3))."

The Secretary of Agriculture has been invited to participate in the annual meeting of the Chesapeake Executive Council for the past few years, and EPA has been an advocate for the Secretary's participation. Depending on the nature of issues before the Chesapeake Executive Council, it may be appropriate for other Department Secretaries to participate in their deliberations. The President's Executive Order broadly contemplates greater Federal leadership.

Question: If, as you say, the Chesapeake 2000 goals are unlikely to be met, what is the overall EPA strategy moving forward?

Answer: On May 12, 2009, President Obama signed Executive Order 13508 on Chesapeake Bay Protection and Restoration, which is the blueprint for Federal action to protect and restore Bay.

Consistent with Section s 202 and 203 of the Executive Order, EPA and other partners will develop a strategy that examines new Federal leadership and action including an overall strategy for improving the rate of progress of Chesapeake restoration.

In addition, EPA, in cooperation with our State partners, is on-track to develop a Bay watershed-wide TMDL by December 2010. Our State partners have implemented new 2 year milestones to accelerate implementation activities, and adopted a goal to have all restoration mechanisms in place by 2025, or earlier.

Question: Some have suggested that local governments should participate (beyond the current Local Government Advisory Committee) in the management or governance of the Program. What is the Administration's position on this recommendation?

Answer: It is the intent of the Chesapeake Bay Program partnership to find better ways for local governments to participate in the management and governance of the Program. Local governments are critical to the success of the Chesapeake Bay restoration efforts. They are largely responsible for land use and stormwater decisions and their cooperation is necessary for the Chesapeake Bay Program partnership to achieve its goals. It is, therefore, important that they and their voices are adequately represented in the governance and management of the newly reorganized Bay Program partnership. On the other hand, there are over 2,000 local government entities in the Chesapeake watershed, and it has been difficult to find a model where they can be adequately and effectively represented beyond providing the valuable advice that the Local Government Advisory Committee is responsible for. One of the outstanding issues for the newly organized Management Board is how and where in the organization stakeholders, including local governments, can be most effective. The Management Board intends to address this issue this summer. In the meantime, Maryland has agreed to champion the issue of local engagement, and the Chesapeake Bay Program Office has initiated programs such as Chesapeake NEMO and circuit riders and funding such as the Chesapeake Bay Small Watershed Grants to assist in and encourage local governments to implement activities to restore the Chesapeake Bay.

Question: Some have suggested that the current partnership-based model for Bay restoration is faulty. What is the Administration's position on this analysis?

Answer: The modern Chesapeake Bay Program was launched in 1983 as a voluntary partnership between the States and Federal Government to achieve ambitious goals for the protection and restoration of the Chesapeake Bay and its tributaries.

The partnership-based model has achieved many successes, and EPA remains committed to and supportive of this model. However, the overall performance of the Bay Program has been unsatisfactory and EPA and the partners are committed to change. This is particularly important with respect to controlling water pollution, which is among the Bay Program's greatest shortcomings. EPA believes we must substantially improve the performance and accountability of pollution control programs throughout the watershed. Neither of the fundamental water quality goals of the 1987 or 2000 Chesapeake Bay Agreements were achieved.

The partnership ensured a building of trust, equity, and experience using science for management and policy decisionmaking. This model has also been effective in having all parties strive for consensus on goals and measurements and has effectively met several of the more straight-forward goals on time or ahead of time (e.g., forest buffers, fish passage, land preservation). In a system as complex as the Chesapeake, creating an atmosphere of equity that allows for agreement not only as it relates to setting goals, but on allocating responsibility for reducing pollution loads has been no trivial task. When the National Academy of Public Administration looked at the Chesapeake Bay Program prior to reorganization (April 2007), they found that "The Chesapeake Bay Program partnerships . . . illustrate the kinds of organizational relationships that are needed to improve impaired waters . . . And still, its partnering mechanisms need improvement in several very important respects. Strengthening partnerships is hard work, and success with it requires a long term commitment. Yet, there is no alternative, if impaired waters are to be restored." [1] As the Program puts more emphasis on accelerating restoration in a time when all of the easy solutions have been applied, the partnership-based model has been reorganized, first to include all of the states within the watershed, including New York, West Virginia, and Delaware, second to enhance the Federal, local, and nonprofit roles, and third to focus on implementation through the Chesapeake Action Plan, adaptive management approaches, and setting shorter-term milestones. It is still our opinion that a partnership-based model is the best option for Bay restoration. This opinion does not preclude better use of existing regulatory programs at the Federal, State, and local levels nor encouraging new regulatory solutions when needed. However, it is particularly important to continue with a partnership-based model when actions taken by one jurisdiction impact waters in another. Meeting water quality standards in the tidal waters of Maryland, Virginia, Delaware, and Washington, DC require action on the part of those jurisdictions as well as from New York and West Virginia. Each jurisdiction having input into allocations of pollutant loads and reductions assigned to their State in relation to the other states is critical to the success of the Bay restoration effort.

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[1] National Academy of Public Administration, April 2007, Taking Environmental Protection to the Next Level: An Assessment of the U.S. Environmental Services Delivery System. Pg. xiii.

TMDL

Question: How can further legislation support EPA's TMDL tributary strategy?

Answer: On May 12, 2009, President Obama signed Executive Order 13508 as part of the Federal Government's efforts to accelerate the pace of restoration of the Chesapeake Bay. Among other things, this order charges the EPA to issue a draft report by September 12, 2009, to "define the next generation of tools and actions to restore water quality in the Chesapeake Bay. ".

Furthermore, EPA and our State partners have developed a framework for implementation of the Chesapeake Bay TMDL. This framework calls for the states to assess, among other things, the gaps in existing programs to fully implement the TMDL. In addition, the States (and EPA) are to make biennial commitments (2 year milestones) to enhance the existing programs to close the identified program gaps. The gap assessment should be completed with the planned establishment of the TMDL in December 2010.

These two efforts at the Federal and State levels will be coordinated and together should provide excellent suggestions for the best opportunities to improve our current programmatic tools for the restoration of the Chesapeake Bay.

A TMDL is essentially a pollution budget, designed to allocate pollution reduction loads that are sufficient to meet water quality standards. A TMDL includes a wasteload allocation for point sources and a load allocation for nonpoint sources. Under present EPA regulations and guidance, point source permits must issued in a manner that is consistent with the load allocations of the TMDL. Nonpoint sources of pollution, however, are not permitted. Nonpoint source pollution control programs are expected to be designed with a "reasonable assurance" that their load allocations will be achieved. As a practical matter, this has not occurred.

There are a number of ways to strengthen the TMDL program to provide a higher degree of confidence of attaining water quality standards. Some of this can be accomplished under existing authorities. EPA is in the process of assessing these opportunities pursuant to Executive Order 13508.

Senator CARDIN. Mr. Fox, thank you for your testimony. I also thank you for your service.

As you point out, we are not going to meet the goals set out in the 2000 agreement by 2010, which is the date that we are supposed to achieve certain, specific goals. There is expectation that EPA may very well put in total maximum daily load restrictions and that it is unclear as to what you can do in regards to point pollution issues and nonpoint pollution sources.

So my question to you is, what do you believe you can do under the existing authorities that you have in order to achieve the maximum desired effect, knowing what the 2000 agreement intended to do? And do you need additional authority from Congress in order to be able to achieve what you believe is necessary in regards to the 2000 agreement?

Mr. FOX. Your question, Mr. Chairman, I think goes to the heart of the challenges that we are facing today. By way of clarification for you and others, TMDL stands for total maximum daily load. In and of itself it is literally nothing more than a piece of paper that has a budget, an allocation for how much pollution needs to be reduced from different sources. The TMDL in itself does not convey any new regulatory authority to the agency, although it does, in fact, guide subsequent permitting decisions that are made over the point sources in the watershed.

Right now within the watershed, EPA under Federal law defines point sources to include wastewater treatment plants, as well as stormwater runoff from urban and suburban areas, as well as CAFOs, concentrated animal feeding operations, the largest, if you will, of the so-called factory farms throughout the bay watershed. There is a range of animal operations that are presently not under the point source permit program, and there is a range of urban and suburban runoff areas that are not part of the point source program.

I think the agency is going to have to look at this and make some determinations as to whether or not we need to strengthen and expand the universe of point sources under current law and whether or not we, in fact, also need to set some more minimum standards for these point sources under Federal law.

I would say, having said all of this, that there is still a very significant part of the pollution load to the Chesapeake Bay that is not regulated under Federal law. This is what we call true nonpoint sources of pollution. This is an area where we might need to talk more with this subcommittee and with some of our State partners to really figure out the best way to capture some of these nonpoint sources within the context of a watershed-wide framework. We can do some of that under current law. There is no question, but the interesting part about this is these are the most cost-effective and cheapest parts of the pollution reduction equation, is what is coming from, in particular, some of the agricultural sides of this equation. And so I think in the end, if we want to really design a true watershed-wide framework, we are going to have to find a way that we incorporate all sources and do this in a way that really gives us a high degree of confidence that we are going to get these pollution reductions from them.

Senator CARDIN. I understand that you have been on your current job for, you said, 30 days and that the Obama administration is still in its first 100 days. So we understand you are still trying to sort out some of the issues here.

I think the guidance we are going to need is that a lot of this depends upon voluntary compliance to a certain degree, particularly in the nonpoint sources. What we need to know, with good science, is how much is coming from the regulated point source pollution issues and how many are nonpoint, and what we need to do to expand the regulatory framework, if you need additional authority and how we can do that in the most cost-effective way without causing major problems for the industries.

That type of advice is going to be critically important for us as we look forward to having an effective regime to reach these results. But it has got to be based upon good science, as we said earlier, and it also has to be based upon what additional regulatory authority you need. When you have the permitting where you can hold up permits, you only can do that to a certain degree. It may work; it may not work. But it's not exactly the most efficient way to go about some of these issues.

Mr. FOX. The one comment, Senator, is that in many ways the Chesapeake Bay—we are the envy of the world. Our scientists have, in fact, defined with tremendous precision the very work that we need to do throughout the watershed. We know today, for example, in each individual watershed how many acres of nutrient management plans need to be implemented on agricultural land, how many buffer strips need to be installed, how many point source sewage treatment plants need to be upgraded. We can really define in very precise terms exactly what work on the ground needs to happen.

I think the challenge, as you suggest precisely, is figuring out what is the delivery mechanism that we can use as Government to help make this happen on the land. And in some cases it might be incentive programs. It might be direct Federal or State funding, and in other cases it might be appropriate use of accountability or regulatory authorities.

But that is to me where I sit now the biggest challenge, taking what the scientists have told us what needs to happen and being able to tell you and the people of the watershed in a very accountable way that we have a likelihood of achieving this over a certain period of time.

Senator CARDIN. I agree. Of course, the stormwater is another issue. What can you do in working with local governments to have a more effective way of dealing with the stormwater issues affecting the bay?

Mr. FOX. The committee will hear from Congressman Connolly who has just done some outstanding work in northern Virginia, and I think he captured very well the challenges with his Tysons Corner example.

The good news is we have some successes to build on. Montgomery County, Maryland recently enacted what we call an MS–4 permit, which is EPA's point source permit for dealing with what we call municipal separate stormwater systems. That is where you get the MS–4. In that, Montgomery County laid out a series of spe-

cific performance standards that it has for new development, as well as retrofitting existing development. And I think that it is going to be actions like this that in fact really help us some of the goals that we have for urban and suburban stormwater runoff.

I have had the privilege of reading the testimony that you are going to hear and seeing some of the photos, and I think the Congressman can describe pretty eloquently not just some of the things we can do on the ground, but frankly how cost-effective they really are.

Senator CARDIN. We look forward to Congressman Connolly's testimony.

We also look forward, though, to your leadership within EPA to figure out cost-effective ways. To me, this is one of the low-hanging fruit areas that we should be able to do much more effective work in and it can be done in a cost-effective manner.

Let me allow Congressman Sarbanes an opportunity to question.

Mr. SARBANES. Thank you, Senator Cardin.

Again, we are so excited at your new role.

I am going to ask a kind of related question, coming at it a little bit differently to what Senator Cardin asked you initially in terms of the EPA being able to have an impact. What are three things that you would look back on and say if the EPA had been more active, proactive, more engaged in enforcement or activity, on these three items, it would have made a significant meaningful, statistically significant impact on the health of the bay, as you look back over the last few years, which I would interpret would then be areas of priority for you going forward?

Mr. FOX. Not to take anything away from the challenges that my colleagues faced in the past, I think if you look objectively today, one would argue that we probably should have required nitrogen removal in wastewater treatment plants sooner and with a higher degree of specificity and aggressiveness than we have. At this point, we are on track to getting permit limits in all wastewater treatment plants by 2010. I think in hindsight, this is something that the scientists showed to us and the engineers showed to us could be done, and it could be done and it could have been done perhaps a little bit sooner.

The MS–4 permits that I mentioned before for municipal stormwater—I think we are now entering a phase where we at EPA are developing a series of fact sheets, model permits. We are seeing some leadership from localities like Montgomery County. I think this is another area where we had the regulatory authority, we had the tools, we have gained knowledge today. Again, in hindsight, this might have been something that we should have moved a little bit faster on.

And then finally, I would say in a very similar vein would be the subject of animal agriculture, so-called concentrated animal feeding operations. This is a very delicate and difficult problem. It is one that has been defined, in part, by the courts. And EPA leadership or, in some cases, lack of, frankly, in the last administration—the agency is just now beginning a permitting program for concentrated animal feeding operations throughout the watershed. I think, in hindsight, this is something too that we probably should have spent a lot more time and energy on many years ago because

when you look at the data, animal manure, as I testified, is responsible for roughly half of the agricultural loads.

Mr. SARBANES. Thank you.

And then my second and last question is, what do you view as the most obvious points of collaboration between agencies and governmental agencies like the EPA that are engaged in this cleanup of the Chesapeake Bay and the citizen efforts that can be undertaken? I mean, put on your hat as a resident of the watershed and as somebody who has been very active at the sort of grassroots level. Where do you see those new opportunities for real collaboration between the "ordinary citizen" who wants to take up this charge and government working together?

Mr. FOX. It is a very good question, and I think all of us today confront a world that is over-deluged by communications from all kinds of things. We all worry in our daily lives about our children and getting them to karate practice or getting them to school on time. And I think we do need to find more effective ways of communicating with people about what they can do to help with the Chesapeake Bay.

Myself personally, somebody who is very knowledgeable about this, when I did remodeling at my home, I put in a nitrogen removing septic tank. I did my own stormwater treatment not just to collect the stormwater from my own house, but I actually collect it from some of my neighbors' houses as well. I am fortunate that I was able to do this.

But I will tell when I did all of this about 8 years ago, it was hard for me to get information to figure out how to do it right, and I think today we have that information. We really just have to find effective delivery mechanisms in this complicated world to get this information to people because I think in their hearts they want to help.

Mr. SARBANES. Thank you very much.

Senator CARDIN. Congressman Connolly.

Mr. CONNOLLY. Thank you, Mr. Chairman, and thank you for your testimony this morning, Chuck.

A question. Do you think it might be helpful, when we look at trying to get local governments cooperating even more in the goals we are setting for the Chesapeake Bay, if we were to have a uniform Federal standard on low-impact development?

Mr. FOX. I am going to perhaps not answer that question as directly as I should, and I say that because the agency, outside of my purview, is in the process of making some regulatory decisions on that very point. And I do not want to in any way jeopardize their record or their decisionmaking.

I would say that I have heard from local governments and I have heard from State governments, many in the bay watershed, that they would love nothing more than EPA to help them by establishing some minimum criteria for how they would go ahead and implement various stormwater management programs.

I will never forget a fascinating discussion with the mayor here in the city of Annapolis—this was many, many years ago—where she expressed a very strong willingness to upgrade her sewage treatment plant. But she made it very clear to me that it was very difficult for her to do that in the absence, in this case, of uniform

statewide requirements for plant upgrades. And she was, at the time, really suggesting to me that that is what we really needed to do. And I think that is precisely the kind of leadership that EPA can and should be providing going forward.

Mr. CONNOLLY. As we move forward—you know, local and State governments in our region have spent a lot of money on water treatment, sewage treatment, even stormwater treatment. One of the concerns, obviously, expressed by both State and local governments is, as we move out to the future and we do adopt more aggressive standards, there is an element of unfunded mandate in this.

Can you talk just a little bit about what the thinking is—I know you have only been there 30 days—in terms of potential additional resources or assistance from the Federal Government to State localities to implement the standards we are talking about?

Mr. FOX. In many ways, this question of funding sources for pollution control is something that I think, getting back to the Congressman's question about how we could have done things differently—in many ways, I think this has sidetracked some of our progress, and let me explain this briefly.

Beginning 2002–2000, there was a lot of conversation about how much would it cost to save the bay. And this resulted in any one of a number of different analyses, including a very high-level blue ribbon task force that presented a series of recommendations to Members of Congress, I think at that point, specifically asking for a multi-billion-dollar Federal funding to help the bay cleanup.

I think as a practical matter in today's fiscally constrained environment, both at the Federal level and the State level, we simply cannot expect that in fact there is going to be substantial increases in public investment. And I think we have to use that as a realistic assumption for how we then develop plans going forward.

So to get to your specific question, many localities, the District of Columbia, Montgomery County, are now implementing stormwater management fees as a way of paying for some of these costs that have to be borne at the local level. It is an "unfunded mandate" at some level in that government agencies set minimum standards. Local governments, in turn, have to find a way to pay for them. And we might be able to look at ways that the Federal Government can help with all of this, but in the end, I think we are going to have to make some judgment about who is the best person to design, operate, and ultimately fund some of these kinds of operations.

One observation I would make too is that if you look at the last 30 years of the Federal Clean Air Act, our Nation has made just tremendous progress improving air quality throughout the Country. We have today requirements for catalytic converters on cars that in fact increase the cost of buying a car. You can go to California and have requirements on the kind of paint you buy trying to limit the VOCs in that that probably results in increased costs of that paint.

I think increasingly we have to think about ways of incorporating some of these costs of cleaning up the Chesapeake Bay into the products, services, and other things that consumers grow to love in the Chesapeake Bay watershed. And I think this is some of our

challenge in figuring out what is the most cost-effective way of crafting these solutions together.

Mr. CONNOLLY. Just a final follow up on that, Mr. Chairman. Might the clean water State revolving fund play a role in trying to help mitigate some of those costs to States and localities?

Mr. FOX. No question it could be very helpful in some cases. Many municipalities already have access to low-interest market funds, so that the SRF programs are not necessarily all that valuable to them, although they do certainly take advantage of it. Generally speaking, there is a very broad array of projects that are eligible under the SRFs. They tend to be much more advantageous to the smaller communities that might not already have access to low-interest loans on the bond market.

Mr. CONNOLLY. I would just say to you in the current economic climate, we may want to take a fresh look at that because a lot of municipalities are having trouble accessing the credit markets.

Thank you very much. Thank you, Mr. Chairman.

Senator CARDIN. Congressman Connolly raises a good point about the fact that you are dealing with so many different local governments within the Chesapeake Bay watershed. We have six States. We have the District of Columbia, a lot of local governments.

You mentioned the Clean Air Act and the challenges we had as a Nation to deal with the quality of our air. Well, to a certain degree the problem of the Chesapeake Bay is similar to the air. It is not only the jurisdictions that are within the watershed. We also have, of course, air pollutants that come in from wherever that affect the quality of the bay. When you implement TMDL, it seems to me it is going to be difficult to figure out how you do that with all these different levels of government.

So I guess my question is, can we learn something from the Clean Air Act? Can we have noncontainment issues if we do not reach certain goals, that there would be restrictions imposed? And then science gives us the options that can be taken. So local governments know what they can do in order to achieve certain results, but they have to be in containment if they are going to be able to be freed from additional requirements. Is there something we can learn from that model?

Mr. FOX. I think there is an enormous amount we can learn from that model.

I did an analysis recently, before I came to this job, of looking at the exact same time period that the Chesapeake Bay Program existed with the progress under the Clean Air Act. And in the period 1980 to—I think at the time I looked at this, the data might have gone through 2002. The Clean Air Act's challenges were just like the Chesapeake Bay. There was an increase in population, increase in vehicle miles traveled like impervious surface that exceeded that of population, increase in energy demand and increase in GDP, and at the same time in that period under the Clean Air Act, the six priority pollutants under the Clean Air Act with GPA measured actually went down by over 40 percent. If you were to compare similar trends on water pollution loads in the Chesapeake Bay, you would not see that decline.

I think some of the examples that you laid out about why the Clean Air Act worked better—I think these are precisely the kind of things that we all need to look at going forward here in the Chesapeake.

The Clean Air Act—one of its root structures is what is called a SIP, State implementation plan, which is not unlike a TMDL. But under the Clean Air Act, all sources of pollution are within that SIP, and there are very clear requirements on the part of the States, as well as the sources of pollution, to take action to stay within the loading caps of that SIP, even in the context of growth.

I remember when I was at MDE, we had a new plant coming into Baltimore. He wanted to locate in a nonattainment area. We said please come in. We want the jobs, but you need to know you need to give us a 2-to-1 offsets for your nitrogen oxide emissions, and that was specific requirements for the SIP and it was a way of dealing with growth in the context of the Clean Air Act.

Senator CARDIN. Well, I think we really need to think out of just the current structure because it was well-intended, but I am not sure it gives us the effect of monitoring to reach the goals that we set and that you are going to need a stronger framework to deal with it.

I do think with a new administration, there are always new opportunities. We should try to take advantage of this. The good news on the Chesapeake Bay is that there is broad consensus that we have got to take this to a new level, and it has been embraced by the business community, by all different parts of our economic fiber that understand the importance of the bay.

So I think we do have a unique opportunity and we need to think beyond just the current structure as to what structure will give you the tools you need to accomplish the results without imposing undue burdens on the private sector, which is obviously a point that we have to be very careful about.

Mr. FOX. Right. Thank you.

Senator CARDIN. I understand you are going to be remaining at the desk. We want to bring up our second panel. In case they need help, you are there to help. You are from the Federal Government. That is good to hear.

The second panel will consist of Gerry Connolly who will move from here to there. The Congressman represents the Fairfax area of Virginia, Virginia's 11th district, has served in local government as chair of the Fairfax County Board of Supervisors, chair of the county's Legislative Committee, and chair of the Northern Virginia Regional Commission, among other roles. In 2002, he was the recipient of an environmental achievement award from the Hunter Mill Defense League and has been recognized by Fairfax Trails and Streams for his environmental stewardship.

Will Baker is well known for his work on the Chesapeake Bay. He is President and CEO of the Chesapeake Bay Foundation, and he has had that position since 1982. The foundation is the largest not-for-profit conservation organization dedicated solely to preserving, protecting, and restoring the Chesapeake Bay. In 1988, Washingtonian Magazine named Mr. Baker the Washingtonian of the Year for his work on bay restoration. Mr. Baker led the foundation in 1992 when it received the Presidential Medal for Environ-

mental Excellence. Will Baker is well known to those of us in Maryland and this region as a person we can go to get an honest assessment of what we need to do in regards to the Chesapeake Bay.

Robert "Bobby" Hutchison is a partner of Hutchison Brothers grain operations. He holds a board position with the Maryland Agricultural Commission, the Maryland Grain Utilization Board, and the Talbot County Farm Bureau. Mr. Hutchison serves as treasurer of the Center for Agro-Ecology, Inc. and is a member of its executive committee and can give us, I think, an honest assessment of the difficulties of agriculture in a very tough environment today and that we make sure that we have balance in what we do in regards to the bay. Agriculture is a critical ingredient to the economy of this region.

It is a pleasure to have all three of you with us, and we will start with Congressman Connolly.

Mr. CONNOLLY. Thank you, Mr. Chairman. Thank you again. I again want to thank you for your leadership. Having a champion such as yourself in the U.S. Congress, especially in the Senate, overlooking this terribly important issue, important to our entire region, is a comfort and I look forward to working with you in the House of Representatives.

I would like to summarize my written testimony, which you have in front of you.

The bay has three main sources of pollution: point sources, agricultural nonpoint source pollution, and urban/suburban point source pollution.

In the past few decades, we have achieved remarkable reductions in point source pollution, as you indicated, Mr. Chairman, in your opening statement. By 2006, for example, sewage treatment plants throughout the bay watershed have reached 72 percent of their reduction goal and 87 percent of their phosphorus reduction goal.

The 2008 farm bill added $4 billion to USDA conservation programs. This dramatic increase in investment will significantly reduce agricultural nutrient and sediment pollution entering the bay.

But despite long-term reductions in point source pollution, the dramatic increases in agricultural conservation spending, the health of the bay has not materially improved. Failure of the bay to recover is due principally to continuing increases in impervious surface areas and associated stormwater runoff carrying nutrients and sediment. According to the Chesapeake Bay Foundation, suburban and urban nonpoint source pollution is the only pollution sector in the bay watershed that continues to grow, and the growth has been dramatic. Between 1990 and 2000, for example, the impervious surface area increased 41 percent in the bay watershed, compared to the 8 percent population growth experienced in that same time period.

The data is fairly clear. This Chesapeake Bay authorization bill must both reduce the spread of impervious surface area that results from sprawl and create regulatory and incentive structures that can eliminate impervious surface areas in existing developed areas. This means we must engage land use practices.

Prior to my election to Congress, I served for 14 years in local government, the last 5 as chairman of Fairfax County. As a subur-

ban county with 1-plus million people, Fairfax County has been ground zero for increasing impervious surface areas. Some of our sub-watersheds have imperviousness between 25 and 40 percent. These expanses of pavement have killed most of our streams. The last native trout in Fairfax County perished in the early 1990s. Stream erosion is so severe that some stream channels have 20-foot high eroded banks.

When I ran for chairman, I pledged to enact a comprehensive environmental agenda to address this. Following the election, the board dedicated 1 full penny in our tax rate to stormwater management for the first time ever, producing $60 million in revenue over 3 years. With this money, we paid for stream baseline assessments that found dramatic differences in stream health that correlated negatively to impervious surface areas. In watersheds with less than 5 percent surface area, we found healthy and diverse populations of benthic macroinvertebrates, fish and good stream habitat. In watersheds with low imperviousness, ranging from 5 to 10 percent, such as watersheds near the Town of Clifton in Fairfax, we found some reduction in species diversity. In watersheds with imperviousness ranging from 15 to 40 percent, however, we found extreme stream bank erosion, little to no benthic macroinvertebrate life and very low diversity in species.

Based on these findings, we then funded 30 watershed management plans for all of our county watersheds to identify what projects would be necessary to protect watersheds with healthy streams. We adopted a low impact development strategy as part of comprehensive plan.

And we found, Mr. Chairman, that developers were more than willing to cooperate. The private sector was more than willing to cooperate in looking at other ways of treating stormwater. So we looked at rain gardens. We looked at green roofs. We looked at the trench infiltration. And we have actually got successful models that we used in the county.

I believe that the local jurisdictions, with a little bit of help from the Federal Government and from the State governments, actually can tackle this problem. I mentioned Tysons Corner. We have an opportunity to retrofit one of the largest urban concentrations of impervious surface in the Chesapeake Bay watershed, and if we have the political will to do so, we can actually turn it around into a green center of technology, into a green urban center in our region and actually address and improve the water quality coming out of that area.

So I look forward to your questions, Mr. Chairman. But I do believe that impervious surface is one of the major culprits for why we have not achieved the progress we had so hoped to achieve in Chesapeake Bay. The good news is I believe there is a lot we can do about it. Thank you.

Senator CARDIN. Now we will hear from Mr. Baker, and if you could bring the microphone a little closer to you, it would be easier, I think, for the people to hear.

STATEMENT OF WILLIAM C. BAKER, PRESIDENT AND CEO, CHESAPEAKE BAY FOUNDATION

Mr. BAKER. Thank you very much, Mr. Chairman. I am especially pleased to be here this morning.

I thank Congressman Connolly for all his great work at the local level, and we look forward to working with him at the Federal level.

Let me, if I might, just summarize the testimony that I have presented to you.

First, it seems to me that it is a terrible disgrace and really a national shame that when you or I go out to a restaurant in our hometown of Baltimore, Maryland, we have probably a 9 out of 10 chance of eating an imported crab cake rather than one that comes from the Chesapeake Bay. If that does not strike home here at the center of the Chesapeake Bay watershed—we cannot get a real crab cake from the bay—something is definitely wrong.

According to NOAA, some 4,500 crab-related jobs were lost in the last decade, all at a cost of $640 million to Maryland and Virginia. That is an economic impact of an environmental damage.

And oysters. H.L. Mencken's immense protein factory is largely boarded up. A generation of kids growing up now may never taste a Chesapeake Bay oyster or see the economic engine that once was the Chesapeake Bay oyster industry.

There is a little good news, and it is important to focus on the good news when we get it. It appears as if native oysters may now be developing a resistance to the two parasites, MSX and Dermo. Maryland in 2008 planted over 500 million hatchery-produced seed oysters. Hopefully, they will have a chance to survive.

And crabs have responded, as we just saw last week, to catch restrictions.

It is a truism, however, that a crab not harvested will remain in the Chesapeake Bay and build the population. But if we hope for more, if we hope for long-term sustainable fisheries and water that is safe for humans, we have to do much more in dealing with water quality. Huge dead zones, water dominated by algae and bacteria and areas that continue to be plagued by toxic contamination—all this adds up to a Chesapeake Bay system which is dangerously out of balance.

As we know, the pollutants causing systemic collapse are too much nitrogen and too much phosphorus, and the same phenomenon is happening worldwide. Here on the bay in our 10th Annual State of the Bay report, the Chesapeake Bay Foundation gave the bay a D. The grade is not so much for the bay itself, as for the government which has failed to put science to work in its restoration.

If you want to search for good news here, there is some as well. It is true we have held our own, as previous speakers have noted, in spite of enormous population growth. One could argue that the per capita impact on the Chesapeake has been reduced by 50 percent or more over the last 50 years as the population has doubled, but none of us are satisfied with saying the bay would have been worse if not for our collective efforts.

So what can we do? Let me make just a few points.

The condition of the Chesapeake is a national disgrace. I say that not so much to be rhetorical as to make a point. While the States have made numerous good-faith efforts over the last several years, the Federal Government has simply not been in place doing what the Clean Water Act has required. A national treasure remains trashed.

Let us look at how we go there. Between 1976 and 1982, Congress funded the largest and most comprehensive scientific study of any body of water conducted in the world, $33 million over 7 years. The result was captured in an Evening Sun—we remember that paper—headline, The Bay is Dying, Scientists Say. The Bay is Dying, Scientists Say.

Central to the collection of studies that were released was the simple fact that the Chesapeake is part of a huge six-State, 64,000 square mile system. Only by managing it as a system was there any hope for restoration. Your predecessor, Senator Mathias, called for a title 2 river basin commission to be the jurisdiction responsible for managing the Chesapeake Bay. That was in 1982. Basically the States said no way. We are not ceding authority to a new jurisdiction. Instead, a new executive council was created which would lead a multi-State/Federal team.

Did it work? Clearly not. I do not know if you have ever been to an executive council meeting, but with few exceptions, they are simply a recitation of individual State actions.

There is no mystery why the bay is not getting any better. Science told us to manage it as a single system, but we are not. Unless there is fundamental change now in how the bay is governed, the next 25 years will be just as grim. Science was right. Senator Mathias was right. But politics got in the way.

We have called publicly on EPA to step up to its management responsibilities under the Clean Water Act. We are cautiously optimistic with the new leadership at EPA. We met recently with Lisa Jackson, and we are certainly very pleased with Chuck Fox as the new Senior Advisor to the Administrator. We are cautiously optimistic that a new era is about to begin. Let us all work together to see that that happens.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Baker follows:]

Statement of William C. Baker
President and CEO, Chesapeake Bay Foundation
Senate Committee on Environment and Public Works
Subcommittee on Water and Wildlife
"Chesapeake Bay Restoration: Status Report and Recommendations"
April 20, 2009

Chairman Cardin and members of the subcommittee, thank you for coming out to Annapolis today for this hearing, and for giving me the opportunity to discuss with you the health of the Chesapeake Bay and the Chesapeake Bay Foundation's recommendations for improving it.

I want to start my remarks today by referencing the two species that are the manifestation of the Chesapeake Bay in most peoples' minds: Chesapeake blue crabs and Chesapeake Bay oysters. Today, the traditional crab picking businesses are almost all gone. Even in our home town of Baltimore, Mr. Chairman, many if not most crabcakes are made with imported crab. Sitting down to a traditional crab feast in any of the area's few remaining crab houses costs more than most people can bear. The few waterman families who still try to make a living from catching crabs are barely hanging on, and then only because they have taken second and third jobs. According to NOAA some 4500 crab-related jobs were lost between 1998 and 2006 at a cost of $640 million to Maryland and Virginia.

And then there are oysters. The native oyster population is so depleted that Mencken's "great protein factory" is largely boarded up. A generation of kids is growing up here and similar cities around the Bay never having tasted a Chesapeake Bay oyster. Until Maryland, Virginia, and the Corps of Engineers reached agreement last week, a significant part of the remaining oystering community looked to an imported species of oyster for salvation. There is some good news, however. It appears as if fewer oysters in the Bay are dying from MSX and Dermo, possibly signaling the development of resistance among the native oysters to the parasite. In addition, a new record was set in Maryland in 2008 with the planting of over 500 million hatchery-produced seed oysters. Still, the overall situation is grim.

Behind the decline of these species stands the fact that every year an immense area of the Chesapeake Bay and its tidal tributaries is essentially dead, without enough dissolved oxygen to sustain healthy life. To complete the dismal picture, the underwater grasses and tidal wetlands so essential to life in and around the water are diminished to a shadow of their historic coverage.

Why? Overfishing, disease and warming temperatures play a role, but the fundamental problem is what we humans have done to pollute the fine, clear waters of the Bay and destroy the grasses and wetlands that are the biological heart and lungs of the Bay ecosystem.

The Chesapeake Bay is arguably the most studied large body of water on earth. It is an unusually complex ecosystem, but there is a great deal of scientific consensus on the causes of its decline. First and foremost among these causes is a huge and systemic overabundance of human-introduced nitrogen and phosphorous flowing into the Bay from the land and the air. This excess of human-introduced nitrogen and phosphorous degrades water quality and contributes to the decline of the Bay's living resources.

Although we are focused on the Chesapeake Bay today, I would note that the same overabundance of nitrogen and phosphorus that degrades the Bay is an increasing problem for waterbodies around the nation and much of the world. The overabundance of nitrogen in the Bay watershed, for example, is only part of the estimated 32 million tons of nitrogen artificially introduced by humans into the United States each year. That figure represents about four and a half times natural background levels. It is little wonder that our natural systems are out of balance.

The Chesapeake Bay Foundation published the first State of the Bay report card on the Bay's health in 1998. In that year, we gave the Bay's health a 27 on a scale of 100. Last week, our 2008 report gave the Bay's health a 28, still a D. In other words, we have showed little real progress overall in 11 years of reporting, despite the hard work of many people and the millions of public and private dollars. For every yard of progress we have gained, we have lost a yard to increasing population (about 1.5 million people in the last decade) and its associated increase in land conversion and pavement.

After 32 years in this business, it does not really satisfy me to get up in the morning and tell myself that it would have been worse if it were not for our efforts.

It has long been noted that people cannot keep doing the same thing over and over and hope for different results. If we have any hope of breaking out of the static or even worsening conditions in which we find ourselves despite our best efforts, the federal, state and local governments of the region simply must take dramatic action to bring about a major reduction in nitrogen and phosphorus entering the tributary system and the mainstem of the Bay.

Today I want to focus primarily on the governance structure responsible for restoring the health of the Bay, and particularly the federal role in it. I will make five main points: 1) The current system of Bay governance has failed; 2) Science tells us to manage the Bay as a single system; 3) We need a new governance structure with EPA in a far stronger role; 4) Congress may well need to give additional authorities to EPA to help it complete the job; and 5) Federal policies and resources outside the control of the EPA need to help support the goal. Allow me to expand on each of these in turn.

1) The current system of Bay governance has demonstrably failed. The current inter-governmental approach of reliance on cooperation and voluntary actions to implement pollution reduction programs is just not going to get the job done. In 1987, the federal government and the states agreed to work together to reduce nitrogen and phosphorus 40% by 2000. They didn't do it. In 2000, they agreed to work together to achieve additional nitrogen and phosphorous reduction goals by 2010. It is now clear that they will not even get close. While it is true that there is a often is a significant lag time between the introduction of a "best management practice" and measurable water quality results, nothing close to the required number of best management practices have been put in place. The complete failure to meet the twice agreed-upon goals evidences the failures of treating these commitments in an exclusively cooperative governance manner.

2) Forty years of intense scientific investigation by leading estuarine scientists have documented precisely why the Chesapeake is degraded and how to fix it. No other water

body in the world can boast this level of scientific understanding. From the molecular to the macro, we know how this marvel of nature works, or doesn't. Most important, science has taught us that the 200 mile long Chesapeake Bay with its 8,000 miles of shoreline are only one part of a much larger ecological system. From Cooperstown, NY, the headwaters of its largest tributary, to the Virginia Capes, where estuarine waters collide with the Atlantic Ocean 650 miles away, the Chesapeake is a single biological and hydrological system. Its boundary is defined by its drainage basin of 64,000 square miles – natural boundaries which declare the political lines of states as insignificant and meaningless.

And yet, its governance has rejected this basic scientific principle, giving only lip service to a *systems approach* to management, one which would address the entire system as single ecological entity. Rather, with rare exceptions, the six states have make their own plans and programs independent of one another. Shared responsibility is no responsibility.

3) The EPA needs to take on a far stronger role. Even the most committed states can only influence pollution within its own borders. Only the federal government has the ability to control pollution across the watershed, and it has failed in its enforcement responsibility. The Federal Clean Water Act passed by Congress over President Nixon's veto 37 years ago provides authority to, and demands accountability from, EPA to protect water quality. It has not done so. From sewage and industrial pipes to chemical-laden stormwater runoff from cities, suburbs and farmlands, the onslaught is awesome.

   We must demand the federal government, and particularly the EPA, to assert its system-wide jurisdictional authority.

   With the failure of the most recent ten year period of cooperation, EPA and its partners are now developing a Total Maximum Daily Load for the Bay watershed that, if taken to the local jurisdictional scale, will create point and nonpoint nitrogen and phosphorus load caps for jurisdictions throughout the Bay watershed. However, as we know, TMDLs are not self implementing. The critical issue is what actions will be done to actually achieve the caps and over what time line. As we have learned with so many TMDLs, if timely

implementation and accountability don't follow the scientific work, the document is barely worth the paper it's written on.

To begin with, EPA absolutely must ensure that any new permit issued under its own authority, or through a state's delegated Clean Water Act program, does not add new nitrogen or phosphous loads to the overall pollution cap. This is the essence of the Clean Water Act, and steps to achieve it can be done now. EPA can, for example, now halt the issuance of permits that add more nitrogen or phosphorus pollution to the Chesapeake ecosystem.

The situation is somewhat more problematic with regard to nonpoint source loads. EPA's authority over nonpoint sources is not clearly defined, and its scope is debated. EPA has stated that it will ensure that the TMDL is "supported by documentation showing that the nonpoint source control measures…can and will achieve expected load reductions". Maryland, Virginia, and Pennsylvania, three of the states involved in the Chesapeake Bay Program partnership developing the Bay TMDL, have agreed to present state implementation plans for achieving the TMDL loads by May 2010. However, we have yet to see any specifics on the mechanisms or funding programs for achievement, and there remains a lack of any defined penalties or consequences for failure to achieve the necessary reductions.

In short, there is nothing yet on the horizon that fundamentally changes the voluntary nature of the traditional, failed process for achieving a large part of the necessary reductions in the pollution that is ruining the Chesapeake Bay. A recent set of estimates from the Chesapeake Bay Program showed that at current rates, we could not expect to achieve necessary reductions in the Bay for decades to come. Given the extremely poor track record of the past decades, we have justifiable skepticism that the needed reductions will occur in a reasonable time frame absent far more aggressive EPA engagement.

4) Congress must strengthen EPA authorities. Congress must be prepared to provide EPA with stronger and perhaps additional authorities it needs to get the job done. In the recent

past, EPA has been a negative force, undercutting the good intentions of the states as the Agency pursued a policy of environmental deregulation. With several partners, we have filed a lawsuit in federal court demanding EPA utilize all of its existing authorities to reduce pollution to the Bay and its rivers. However, additional tools may well be key to finishing the job. We urge Congress to do two things to enhance the EPA's current authorities:

First, we urge Congress to pass language clarifying EPA's jurisdiction over the entire network of wetlands, streams, and waterways of the Chesapeake Bay watershed. The simplest way to do this is to pass the Clean Water Restoration Act introduced earlier this month by Senator Feingold and others, including Senator Cardin.

More than forty years of scientific research by the Stroud Water Research Center in southeastern Pennsylvania attests to the critical importance of small headwater streams in removing pollution from higher order streams and rivers, as well as in preserving aquatic and riparian life throughout the entire system. Stroud's research also attests to the extreme vulnerability of seepages and first order headwater streams. The Chesapeake Bay receives half of its water from a network of 110,000 streams and 1.7 million acres of wetlands, most of which are non-navigable tributaries and non-tidal wetlands that drain to those tributaries. Other studies have shown that non-tidal wetlands near the Chesapeake Bay removed an estimated 89% of the nitrogen and 80% of the phosphorus that entered the wetlands through upland runoff, groundwater, and precipitation. Ensuring EPA jurisdiction over all of these waters and wetlands is key to a healthy Chesapeake.

In addition, we urge Congress to give EPA clear authority to either regulate nonpoint pollution directly, or to give it additional means to ensure that states bring nonpoint sources of nitrogen and phosphorous pollution under control. Given the pressing issues facing Congress today, our preference is that Congress not try to open the Clean Water Act generally, but rather that it use the reauthorization of section 117 to create a statutory requirement that states must provide the EPA with reasonable timelines for controlling the nonpoint sources of pollution or face stipulated consequences and penalties.

4) My fifth and final point is that federal government policies and financial and technical resources, both controlled by the EPA and outside of its purview, need to be supportive of Chesapeake Bay restoration. We appear to be moving to some degree in that direction, as evidenced by at least four recent examples. First, significant farm bill resources were directed last year to assist farmers and landowners in the Chesapeake Bay watershed to better manage their fertilizers, including animal manure. Second, in 2007 Senator Cardin and others showed great leadership in requiring new federal buildings and installations – of which we have more that our share in this area – to better manage stormwater. Third, the Recovery Act included significant resources to limit pollution from wastewater treatment and other sources, as well as additional funds that NOAA, the Army Corps of Engineers, the Department of Agriculture and the US Fish and Wildlife Service may apply to Bay restoration. Lastly, several members of the House are working in the FY2010 appropriations process to increase the Bay Program related small watershed and nutrient reduction grants which are well used and badly needed by local governments and private watershed groups to make water quality progress at the local level.

   Over time, if the result of more effective regulation results in disproportionately high costs for some sectors, subsequent federal investments need to be strategically directed to easing that burden.

   Finally, I want to note the extraordinary opportunity that we a have in the upcoming Surface Transportation reauthorization bill to address the serious water pollution generated by the nation's existing million miles of federal aid roads, and the countless more miles to come. I urge you to take aggressive action to address this ongoing, federally-subsidized source of pollution of our streams, rivers, lakes, and estuaries.

Before closing, I also would like to briefly touch on four of the Chesapeake Bay's most important fisheries—menhaden, blue crabs, oysters, and striped bass. As I noted at the beginning of the statement, blue crabs and oysters are severely depleted, yet we believe that there may be some reason for hope if the governance and pollution issues can be solved.

Blue Crabs

The Chesapeake Blue Crab fishery has now been officially recognized by NOAA as a disaster, simply confirming what we have all known for a long time. However, we believe that the states of Maryland and Virginia are working very well and cooperatively together to make management decisions based on good science. These decisions are painful in the short run, but we believe that the science is clear. If cooperative fishery management decisions follow the science, and the water quality and grasses improve significantly, the population will rebound. The only request that we have of the federal government is that Congress continue to generously fund the important work that NOAA is doing in this area.

Oysters

A five year scientific investigation of whether to introduce the Asian oyster to the Bay has recently drawn to a close. Although the Environmental Impact Statement contained much uncertainty, it did identify causes for concern with the Asian oyster and reasons for hope with our native oyster. Accordingly, federal and state officials opted for caution, a position that we applaud. It is now clear that the native oyster is and will be the Chesapeake Bay oyster of the future.

There is an increasing body of evidence that the native oyster is becoming more tolerant of the two diseases that have helped to decimate the population, as well as peer-reviewed evidence that oysters do better as pollution diminishes and dissolved oxygen in hypoxic zones increases. This is very good news for the possibility of restoration. We also have a growing record of success in oyster aquaculture. There are several places in the Bay where entrepreneurs are making money with private oyster farms. The sterile native oyster, which grows faster than the non-sterile variety, appears to have great potential when cultivated both in the highly controlled environment of cages and floats, and on the bottom, where greater numbers can be grown at a reduced per unit cost.

We believe that there is a bright future for native oyster restoration as long as federal, state, and private investments are strategically made. I want to emphasize again that the water quality problem must be aggressively dealt with, as must the problem of increasing predation by cow-

nosed rays, the population of which is exploding as its traditional predators are reduced. We must begin to find ways to address this problem.

Federal investments through NOAA and the Corps of Engineers continue to be critical to the long-term future of the native oyster in the Bay. We are hopeful that a significant down payment on oyster restoration activities will be made through funds appropriated to NOAA in the recent Recovery Act, and annual appropriations for both agencies are important. We now have a significant body of knowledge and experience in oyster restoration, and we just need to be prepared to make the kinds and the levels of strategic investments that will allow us to succeed.

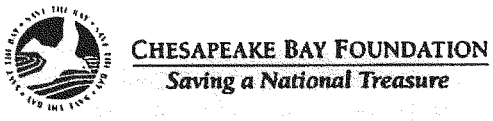
Menhaden

Menhaden are a species rarely consumed by people but critical to the ecological health of the Bay. Among other things, they are a primary food source for striped bass. Over the past several years, they have been fished industrially by one company and removed from the Bay ecosystem in great quantities. We are now three years into a five year negotiated cap on how many menhaden that company can remove from the Bay. The five year cap period also corresponds to a period of intense study designed to help the Atlantic States Marine Fisheries Commission to develop an ecologically sustainable management plan for the stock. CBF is committed to this process. However, it is certainly our view that if the ASMFC does not use this period to develop and present a management plan in a timely way, Congress should step in to ensure that menhaden can continue to play their key role in the ecosystem.

Striped Bass

Finally, I want to note that we are seeing a troubling amount of bacterial disease in the striped bass population. This disease, known as mycobacteriosis, was first identified in Chesapeake striped bass in 1997 and is generally thought to be fatal. In fact, scientists have now documented a higher death rate in stripers due to the disease. While the exact causes are not known, poor water quality, poor nutrition, or both are leading candidates. A good deal of research is going on to better understand these diseases and the impact that they have on both the fishery and the ecosystem.

Mr. Chairman and members of the subcommittee, the Chesapeake Bay is the largest estuary in the United States and one of America's great national treasures, a fact that Congress itself officially recognized in passing the Section 117 reauthorization bill in the year 2000. We continue to treat it shamefully. It is long past the time for the federal government to get tough on reducing the pollution that is so terribly degrading its waters and the lives–human and non-human–that depend on them. I urge you to do all that is in your power to change course now, before it becomes too late to reverse our actions and leave our descendants a healthy Chesapeake Bay.



May 27, 2009

The Honorable Barbara Boxer, Chair
Committee on Environment and Public Works
410 Dirksen Office Building
Washington DC 20510

Dear Senator Boxer:

In your letter of May 13, 2009, you asked me to respond for the record to additional questions for the April 20, 2009 field hearing of the Water and Wildlife Subcommittee. I am happy to do so.

The questions that you posed are:

In your testimony, you highlighted excess nitrogen and phosphorous as the primary threat to the Chesapeake Bay. What tools do you believe EPA currently has that could be used more effectively to reduce the amounts of nitrogen and phosphorous flowing into the Bay? What specific additional authorities do EPA, and in particular the Chesapeake Bay program, need to effectively address nitrogen and phosphorous pollution?

Question 1: What tools do you believe EPA currently has that could be used more effectively to reduce the amounts of nitrogen and phosphorous flowing into the Bay?

The Chesapeake Bay Foundation (CBF) has been encouraged to read statements by Administrator Jackson that EPA will use the full extent of existing law for Chesapeake Bay restoration (shortly after her confirmation, the Administrator advised EPA staff that the Agency would "make robust use of [EPA's] authority to restore threatened treasures such as … the Chesapeake Bay.") We were pleased to hear Senior Assistant to the Administrator J. Charles Fox echo that commitment at the April 20 field hearing (EPA would "make strong use of our authorities" and "better focus our existing regulatory authorities").

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CBF in an April 28, 2009 letter to the Principals' Staff Committee of the Chesapeake Bay Executive Council provided specific actions that EPA can take under its existing authority to accelerate restoration of the Chesapeake Bay. These included:

1. Requiring numeric limits for nitrogen, phosphorus, and sediment in all municipal stormwater permits issued in the watershed, consistent with loads necessary to achieve water quality standards.

2. Denying the issuance of NPDES permits for new or expanded discharges, including "traditional" point sources (e.g., sewage plants), but also MS4s and construction general permits (40 CFR 122.4(i)) as well as new air pollution permits such as proposed coal fired power plant permits.

3. Exercising its discretionary authority under 33 USC §1342(p)(6) and 40 CFR § 122.26(a)(9)(i)(C) and (D) and require Clean Water Act discharge permits for additional sources of stormwater.

4. Developing, on a fast-track, regulations that would require stringent emissions reductions from power plants that goes beyond the remanded Clean Air Interstate Rule.

5. Expanding and fully exercising oversight of delegated Clean Water Act permitting programs.

We believe that were the EPA to regularly and effectively exercise these existing authorities, it could make tremendous progress towards ensuring that pollution was reduced, in a reasonable time frame, to no more than the Bay could assimilate and still maintain water quality.

Question 2: What specific additional authorities do EPA, and in particular the Chesapeake Bay program, need to effectively address nitrogen and phosphorous pollution?

Under section 303(c) of the Clean Water Act and related regulations, as well as Consent Decrees settling *American Canoe Association, Inc. and the American Littoral Society v. EPA*, Civil No. 98-979-A (E.D. Va) and *Kingman Park Civic Association, et al. v. U.S. Environmental Protection Agency, et al.*, No. 1:98CV00758 (D.D.C.), the states constituting the Chesapeake Bay watershed are required to develop total maximum daily loads for all segments of the Chesapeake Bay and its tidal tributaries that are impaired from the discharge of nitrogen, phosphorus and sediments and identified on the Bay states' 2008 section 303(d) list of impaired waters. (See Chesapeake 2000 Agreement.) Further, a maximum aggregate watershed pollutant loading for nitrogen, phosphorus and sediment necessary to achieve the Chesapeake Bay's water quality standards will be identified and divided among the states and major tributary basins. Both wasteload (point source) allocations and load (nonpoint source) allocations must be specified.

CBF believes that EPA must have clear authority to ensure that all the actions necessary to achieve these allocations, or caps, are fully implemented within a reasonable period of time. Central to the idea of ensuring implementation is having strong enforcement mechanisms available to assure timely progress and achievement of the caps.

We have argued that EPA currently has the tools available to ensure full compliance not only with the wasteload allocations, but with the load allocations as well. In addition to the actions described above, we believe that the key to this lies in more clearly defining and enforcing EPA's standing "reasonable assurance" policy. In particular, CBF has advocated that to comply with this policy and the Clean Water Act, the EPA must require the states to:

- Identify the funds and permitting programs for both point and nonpoint source reductions.
- Identify the Bay watershed states' laws and regulations (and implementation policies or guidance) that will leverage and require reductions.
- Include wasteload allocations for all – not some – wastewater treatment discharges (in some instances a capped aggregate loading may be appropriate).
- Include wasteload allocations for municipal stormwater discharges.
- Include local pollution load caps so that local governmental authorities will have pollution reduction targets to frame implementation efforts.
- Reopen all NPDES permits, as well as any other permit it includes as part of the reasonable assurance provisions, and require new pollution discharge limits consistent with the TMDL.
- Include a timeframe and deadlines for achieving the necessary pollution reductions as well as reporting mechanisms for monitoring achievement of reductions.

EPA has begun to embrace this construction of "reasonable assurance", requiring, for example, that the states must develop TMDL implementation plans that EPA will include as part of the TMDL record of decision. Key to the success of this approach is for EPA to indicate consequences and sanctions it will pursue if the states fail, including the ideas that we expressed in response to the first question.

We anticipate that the proposed administratively-derived construction of "reasonable assurance" may generate legal challenges. Given that these challenges could produce long delays in achieving water quality standards, Congressional action to clarify EPA's authority needs to be an option. The most likely legislative scenario is for Congress to make changes to Section 117 of the Clean Water Act, which could include:

- Codifying the pollution allocations contained in the Bay-wide TMDL, including the sub-allocations down to the local (e.g., county) level.
- Codifying the definition and application of "reasonable assurance" described above.

- Codifying the two-year milestones as well as a new "implementation deadline" (the date by which the EPA and states will implement all pollution reduction practices watershed-wide).
- Requiring that EPA and the Bay states report progress toward achieving the two year milestones with estimated pollution loads identified by jurisdiction and sector (e.g., point sources, MS4s, CAFOs, etc.).
- Including a citizen enforcement provision for failure to achieve the caps.
- Clarifying the authority of EPA to penalize states or assume enforcement of state authorities when there is a failure to achieve the designated milestones and caps.

This legislative construct is similar to what currently occurs under the Clean Air Act, and will result in the necessary accountability and enforceability. That is, the states develop implementation plans with timeframes and milestones and contingencies. If they fail to develop adequate implementation plans or accomplish the promised programmatic changes or achieve the pollution reduction milestones, EPA would sanction the states with consequences. Using the CAA as a model, for example, additional federal sanctions could include giving EPA the authority to issue a federal implementation plan; mandating a 2:1 pollution offsets for new or modified sources; assessing penalties or fees levied against large point sources, or withholding federal grants.

Concurrent with the establishment of an enforceable nitrogen, sediment, and phosphorus pollution cap in the Chesapeake Bay watershed, CBF believes that there is a need for EPA to evaluate the establishment of a Nitrogen Emission Trading and Offset Scheme which would help to achieve and maintain the established pollution cap. The legislation described above could include a mandate to EPA to evaluate and establish the Trading and Offset Scheme. The scheme would include various elements to ensure accountability and achieve the most cost effective pollution reductions and maintenance.

Executive Order 13508 requires EPA to "examine how to make full use of its authorities under the Clean Water Act to protect and restore the Chesapeake Bay and its tributary strategies." The required report must be available for public comment in early November. We will know at that point whether EPA does or does not believe that it has the current authority to ensure implementation of the necessary actions throughout the watershed. If it does not, and no other resolution is available, Congress must step in to make sure that the authorities necessary to get the job done are available and effectively used.

Sincerely,

//s//

William C. Baker
President

Senator CARDIN. Thank you, Mr. Baker.
Mr. Hutchison.

STATEMENT OF ROBERT HUTCHISON, PARTNER, HUTCHISON BROTHERS

Mr. HUTCHISON. Thank you, Mr. Chairman. My name is Bobby Hutchison, and I am kind of overwhelmed to be a part of this panel. I am here today on behalf of the Maryland Farm Bureau and Maryland Grain Producers to express my thoughts on the progress made in bay restoration and some ways that we think we can accelerate it.

Four insights that I would like for you to take away today are:

One, Maryland farmers lead the Nation in the use of best management practices and advanced technology to protect the environment and specifically the Chesapeake Bay.

No. 2, Maryland farm businesses are relatively small family operations. They do not have environmental compliance officers or attorneys on staff. They are husbands and wives sitting at a kitchen table at the end of the day trying to keep up with all the paperwork.

No. 3, all new environmental regulations aimed at protecting the bay have significant economic impacts on small businesses in the watershed. Cost-share programs by the Federal and State governments are not grants. They involve substantial monetary investment by farmers.

And No. 4, Maryland farmers are willing to do more to protect and restore the bay if the programs are reasonable, economically feasible, based on sound science, and equal to the efforts being made by other sources of bay nutrients.

To give you a little bit of background about myself, I farm with two brothers, a son, and a nephew in Cordova on the eastern shore on a 3,600-acre farm. We grow grains, corn, soybeans, barley, wheat, and also processing vegetables, peas, lima beans, and cucumbers. We also sell seed corn to supplement our income.

Tremendous progress has been made. Since the bay restoration efforts began in the mid-'80s Maryland farmers have made tremendous progress. Farmers are applying nutrients based on certified nutrient management plans. All poultry feed includes phytase. Cover crop acreage has expanded considerably, and new best management practices are added annually.

A review of Maryland's BayStat model shows that agriculture is progressing toward meeting its goals. EPA's assessment, table 1, shows that agriculture is close to 50 percent of its goals, but urban programs have declined by more than 60 percent in every category. Maryland farms are now responsible for only 7 percent of bay nitrogen and 8 part of bay phosphorus.

The Bay Commission Cost Effective Strategies have defined six best management practices. Five of those were from agriculture. We are concerned that undue emphasis has been placed on the agricultural best management practices to clean up the bay.

I also believe strongly that the Chesapeake Bay Program has failed in its efforts to restore the oyster population in the bay. Without these natural feeders, water quality will never be restored

regardless of the activities that occur on the land. This must be a priority.

The bay model needs to be improved to take into account things that the farmers are doing that they do not receive Federal funding for. These include no-till, variable-rate fertilizer application, slow-release fertilizer use, chemical storage, and even some traditional practices such as buffers, stream fencing, and grassed waterways, and these are totally at the farmers' expense and are not given credit in there.

The bay model is also out of date in some of the figures it uses. For example, in 1985 my corn yields were 100 bushel. Today they are 120, with irrigated fields running close to 245 bushel. It is important that the bay model uses the characterization of agriculture and nutrient use in Maryland, and it is imperative that it is updated and there is greater transparency with the data that is being used to compile agricultural progress.

We have made significant improvements, and I refer you to table 2 that shows the efficiency of nitrogen use. In 1980, we were producing .6 bushel from a pound of nitrogen. In 2005, that was up to 1.3 bushels. In phosphorus, it was from 1.33 pounds per bushel to 2.89. That has come through genetic improvement and also better practices, ways of applying nutrients such as side dressing, split applications on small grain, and use of slow-release nitrogen products.

We are going to see more improvement as the future goes on through bio-technology. There is drought-tolerant corn that is just around the corner. There is better nitrogen efficiency use with corn just around the corner. So we will see that increase as time goes on.

Also, there are things coming on board such as GreenSeeker, which is the ability to go across the field and measure the nitrogen that is in the crop and apply the rate as to what is already there, a variable rate. But that is experimental. It looks very promising.

There is also technology for poultry litter injection, and that is promising.

One of the things that we can do immediately is produce ethanol from barley in the bay. There are several groups looking at it. I was part of a group that looked at it and we decided not to move forward with our project, although we believe it would work. But Chesapeake Energy down in Somerset is talking about building a plant, and they are planning to use barley. But more importantly, Osage BioEnergy in Hopewell, Virginia has broke ground on a barley plant. They will use up the 300,000 acres of barley that can be grown so it can act as a cover crop and work for water quality. And then on top of that, after you get the benefits from the grain, if we learn to make cellulose ethanol from the straw, it can be a win-win for the bay.

We are concerned about the CAFO rules being applied more strictly in region III than they are in other parts of the country, and we think there should be some attention given to that.

And we are also that the technical providers that we go to in agriculture have a knowledge of our farming practices. There is a core group out there of the Extension, crop consultants, and local soil conservation districts, and we think that is where the money

should come down and go through those agencies as opposed to diluting an already short supply by bringing in other groups to work with us.

Sustainable agriculture. That means something different to every one of us. I would suggest that sustainability involves maximizing yields to meet future nutritional needs while decreasing impacts on the environment. If farming does not provide a reasonable income to the farmer, it cannot be sustained. I believe the bay program documentation clearly demonstrates that a well-managed farm is far better for the bay than urbanization. The agricultural community maintains its willingness to work with Congress, the Governor, the bay program, and all other interested parties to do our part to clean up the bay. We ask for your support for adequate technical assistance and an understanding for the needs of economically viable family farms.

Thank you, and I apologize for going so far over. Thank you.

[The prepared statement of Mr. Hutchison follows:]

**THE JOINT STATEMENT OF THE
MARYLAND FARM BUREAU AND THE MARYLAND GRAIN PRODUCERS
ASSOCIATION TO THE
SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON WATER AND WILDLIFE
REGARDING THE CHESAPEAKE BAY RESTORATION PROGRAMS**

April 20, 2009

Presented by Robert Hutchison
Talbot County Farmer

Good morning, my name is Robert Hutchison. On behalf of the Maryland Farm Bureau and the Maryland Grain Producers Association, I am pleased to be here today to express my thoughts on the progress of the Chesapeake Bay Restoration and some thoughts on ways to accelerate progress.

The four insights that I would like for you to take away today are:

1. Maryland farmers lead the nation in the use of Best Management Practices and advanced technology to protect the environment, and specifically, the Chesapeake Bay.

2. Maryland farm businesses are relatively small family operations. They do not have environmental compliance officers or attorneys on staff. They are husbands and wives sitting at the kitchen table at the end of the day trying to keep up with all the paperwork.

3. All new environmental regulations aimed at protecting the Bay have significant economic impacts on small businesses in the watershed. Cost-share programs by the federal or state government are not grants – they involve substantial monetary investment by farmers.

4. Maryland Farmers are willing to do more to protect and restore the Chesapeake Bay if the programs are reasonable, economically feasible, based on sound science and equal to the efforts being made by other sources of Bay nutrients.

First I would like to tell you a little about my farming operation. My two brothers, my son, a nephew and I, run a 3600-acre family farm in Cordova on Maryland's Eastern Shore. We grow corn, soybeans, wheat, barley, peas, lima beans and cucumbers. We also sell seed corn to

supplement our farm income. I am past President of Maryland Grain Producers Utilization Board (MGPUB) and the Association (MGPA), the Talbot County Farm Bureau and serve as the current treasurer of the Harry Hughes Center for Agro-Ecology.

On our farm, we have installed either grassed or forest buffers along all of our continuous flowing streams. Much of this was done without cost share funds, but we did install some buffers under the Conservation Reserve Enhancement Program (CREP). We have installed several grassed waterways on our farm and use no-till as a preferred tillage method. We use Global Positioning Satellite (GPS) technology to determine our crop yields and use this data, along with soil testing, to make future crop decisions.

Since 1982, we have hired crop consultants to ensure that we manage nutrients and chemicals as efficiently as possible. Our crop consultants do our soil tests, prepare our nutrient management plans and scout our fields using integrated pest management (IPM). We have participated with the University of Delaware to help establish a Stalk Nitrate Test to improve nitrogen use efficiency and we routinely use Pre-sidedress Nitrogen tests (PSNT) where we apply poultry litter.

Another product we are working with is slow release fertilizer. While there is no economic benefit for us (the reduction in the cost of fertilizer used is offset by the cost of the product), I believe the Bay may benefit from the use of these slow release fertilizers. If research can demonstrate that it is a win-win situation for both farmers and the Bay, its use could increase substantially.

Although we do not have poultry on our operation, we have used poultry litter in accordance with a nutrient management plan to improve our low Phosphorus soils. While no-till is our preferred tillage mechanism for corn, we have used minimal tillage systems with poultry litter because current scientific research shows that it is important to incorporate this product. Last year we purchased a Turbo Till™ - vertical tillage equipment to improve incorporation. This helps preserve the nitrogen for the crop, while at the same time protecting the Bay. We made the decision to use poultry litter not only because it is an excellent source of nutrients, but also because of our strong belief that the Delmarva Poultry Industry is extremely important to the economics of agricultural operations in Maryland. Utilizing poultry litter on those fields that need Phosphorus is important to the industry and the Bay. Our decision led to the purchase of two new spreaders and two loaders.

Corn is Not Bad for the Bay

Unfortunately, corn has been unfairly labeled as a leaky crop. With adequate rainfall during the growing season and the planting of a cover crop on an "as needed" basis after harvest, corn is as efficient at nitrogen use as any other crop. We sidedress our corn using a pressurized application process that reduces nutrient loss. For fields with irrigation, where water is applied to satisfy crop needs, our corn crop is extremely efficient. One of corn's minor inefficiencies that we are working with researchers to address is the decline in nutrient use after the crop has finished its active growing season prior to harvest. By comparison soybeans take up more nutrients because they are still growing during the early fall.

Tremendous Progress

Since Bay Restoration efforts began in the mid-eighties, Maryland farmers have made tremendous progress. Farmers are applying nutrients based on certified nutrient management

plans, all poultry feed includes phytase, cover crop acreage has expanded considerably and new best management practices are added annually. A review of Maryland's BayStat model shows that agriculture is progressing towards meeting its goals. EPA's assessment (see table 1) shows that agriculture has met close to 50% of its goals but urban programs have declined by more than 60% in every category. Maryland farms are now responsible for only 7% of all Bay Nitrogen and 8% of all Bay Phosphorus.

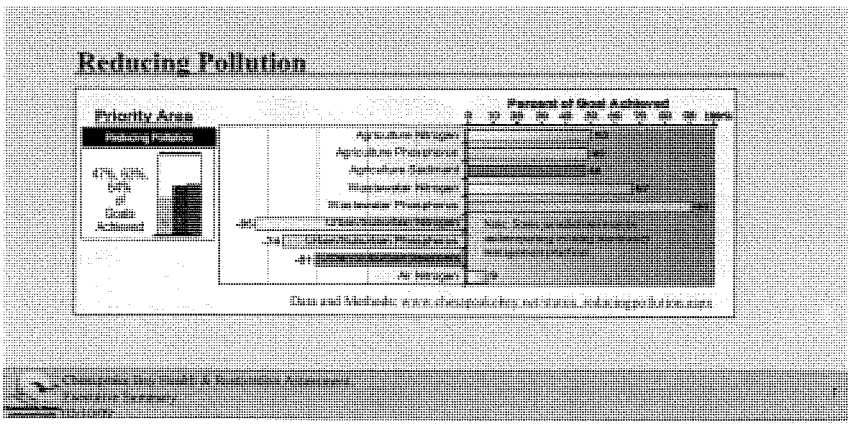


Table 1

A 2004 report by the Chesapeake Bay Commission entitled "Cost Effective Strategies for the Bay" identified the six most cost effective best management practices. It listed upgrading sewage treatment plants as number one and the next five strategies were agricultural BMPs. One concern of the agricultural community is that this study resulted in too much emphasis being placed on agricultural BMPs. The EPA assessment shows that while we are moving forward and implementing additional practices, our success is being offset by urban programs that are going

backwards. Responsibility for restoration efforts must be shared by all sectors – not just agriculture. I also believe strongly that the Chesapeake Bay Program has failed in its efforts to restore the oyster population in the Bay, without these natural filter feeders, water quality will never be restored, regardless of the activities that occur on the land. This must be a priority.

The Bay Model Must Be Improved

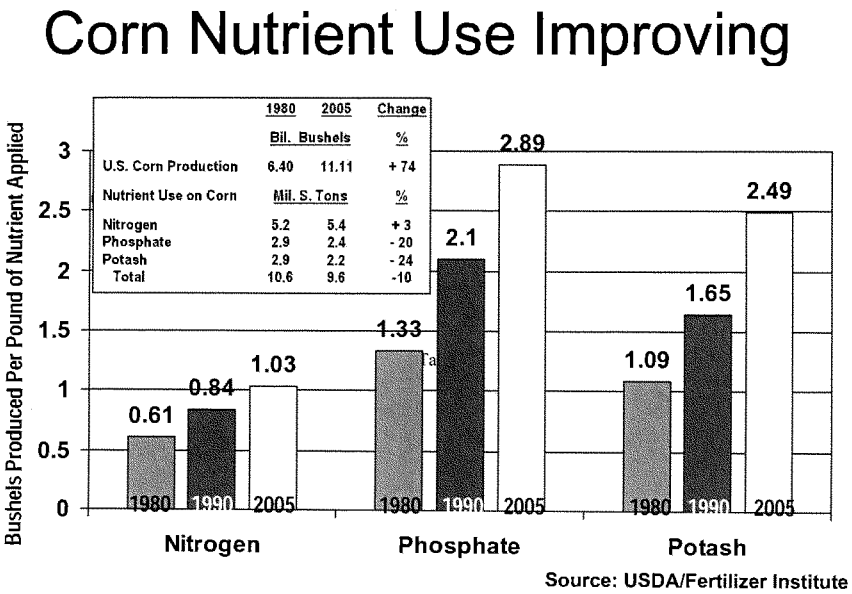
Many environmentally beneficial farming activities receive no government funding. This includes no-till, variable rate fertilizer application, slow release fertilizer use, chemical storage facilities and even traditional best management practices - such as buffers, stream fencing and grassed waterways that are installed totally at the farmers' expense. This is good for the Bay; however, the Bay model does not count these items. The Bay Program must develop a method to incorporate all of agriculture's accomplishments into the model.

The Bay model is also out of date. In 1985 the yield on my farm was 100 bushels per acre. Today my average is 120 with some irrigated fields yielding as high as 245 bushels. Our farm is not unique. Farmers across the country are seeing significant increases in yield and improved nutrient efficiencies. The Bay model is severely delinquent in its characterization of agriculture and nutrient use in Maryland and it is imperative that it is updated and that there is greater transparency with the data that is used to compile agricultural progress.

Progress Through Biotechnology

Since the Bay Program started, agriculture has been making yield improvements with reduced nutrient inputs (see table 2). Much of this improvement has been made as a result of improved crop genetics. The improvements made during the past decade with the use of biotechnology

have been significantly greater than earlier progress. Biotechnology will also be bringing new benefits within the next 5 years. Of particular interest to farmers in the Bay watershed is new varieties with drought tolerance. Annual yield variations occur in this region due to irregular weather patters. In 2007, Maryland farmers experienced a significant drought and it is these unpredictable yields that can hamper sound nutrient management. We welcome the arrival of drought tolerant and more nutrient efficient varieties.



	1980	2005	Change
	Bil. Bushels		%
U.S. Corn Production	6.40	11.11	+ 74
Nutrient Use on Corn	Mil. S. Tons		%
Nitrogen	5.2	5.4	+ 3
Phosphate	2.9	2.4	- 20
Potash	2.9	2.2	- 24
Total	10.6	9.6	-10

Table 2

A New Approach to Federal and State Cost-Share Assistance

In the past two decades federal and state cost-share programs have helped farmers install over 19,753 projects with $91 million in government funds that have been supplemented with at least $13 million of farmers matching funds.

Contrary to the tried and tested traditional BMPs that are used on farms, many of the new methods to improve nutrient efficiency do not require the installation of a specific practice such as a buffer or filter strip. Instead these systems are management options that often involve the expense of new equipment or a new management system. If the Bay Program wants to help advance these innovative options, they must be willing to help farmers in new ways. Traditionally, equipment has not been considered eligible for cost-share. But equipment such as GPS, yield monitors, variable rate applicators, and vertical tillage equipment such as the Turbo Till enable farmers to apply nutrient more efficiently. Currently being tested at the University level is new imaging equipment such as GreenSeeker™ technology and poultry litter injection equipment that will significantly improve nutrient use by crops. USDA programs must recognize these new management tools and provide incentives to farmers to embrace these Bay-beneficial technologies.

Barley Ethanol Production is a Win-Win

I personally have spent many hours advancing ethanol production in Maryland. Working initially with the Maryland Grain Producers Utilization Board and later with Chesapeake Ethanol LLC, I have studied options for Maryland farmers to benefit from biofuels. The new market that corn ethanol has provided for farmers across the country has been extremely important to this region.

Maryland grain farmers, through our checkoff program, the Maryland Grain Producers Utilization Board, first started promoting ethanol as a much needed new use for corn in the early 1990's. In 2001, however, we decided to investigate the option to use barley for ethanol instead of corn. We did not want to reduce the amount of available corn for the poultry industry, our number one customer. Everyone in Maryland agriculture recognizes the need to protect and maintain a viable poultry industry on the Eastern Shore. We did, however, want to improve the price of our crops because grain farmers were struggling to make ends meet.

We worked from 2001 until 2007 to develop a barley-based ethanol plant to establish a new market for barley - an under-utilized crop - and to expand the opportunity to grow winter crops to protect the Chesapeake Bay. The Maryland legislature supported this effort by passing the Renewable Fuels Promotion Act of 2005 to provide a production credit of 20¢ per gallon for ethanol made from small grains. To achieve the economies of scale necessary for the plant to produce ethanol that was price competitive, we planned to bring corn into our proposed mixed grain facility in Baltimore for about 8 months of the year. I will not go into all the details but suffice it to say Chesapeake Ethanol LLC, the company established to commercialize the project, decided not to move forward early in 2007. This was due in part to the fact that corn-based ethanol plants either built or under construction were reaching the 15 billion gallon per year cap established under the federal Renewable Fuels Standard.

Maryland Grain Producers were not the only group interested in building ethanol plants in Maryland. We spoke frequently with organizers of Atlantic Ethanol in Baltimore City and Ecron

in Baltimore County both of whom obtained air quality permits for their projects but chose not to move forward. Today, Chesapeake Renewable Energy is still planning to move forward with a project in Somerset County, Maryland, and we are extremely pleased that they have decided to use barley for part of their production. The Maryland Department of Agriculture has certified Chesapeake Renewable Energy to receive the 20¢/gallon production credit for using small grains and we hope they get their funding and move forward with production. Today in Hopewell, Virginia, Osage BioEnergy is building a 60 million gallon barley-based ethanol plant, which will increase barley production by 300,000 acres, much of which will take up nutrients as winter cover crops in the Chesapeake Bay watershed.

I believe that promoting barley based ethanol is a win for Maryland farmers and a win for the Bay. Barley grown over the winter serves as a cover crop, utilizing any left-over nutrients. It can be harvested the following June for biofuels and then be followed by short season soybeans or corn on irrigated land. Any new ethanol facilities coming on line in Maryland will need to meet advanced biofuels standards to establish a market. I encourage the Bay Program to support next generation biofuels development in Maryland with an immediate opportunity for barley.

Federal CAFO Rules Over-Reach to Target Poultry Producers

Although not a poultry farmer, I am very concerned about the impact the new CAFO regulations are having on the state's largest agricultural sector and the biggest customer for the grain I grow. The EPA Region III office has put almost every poultry grower on Delmarva on notice that a federal permit is required. In most cases, this appears to be added workload and expense without a clearly defined benefit to water quality. We urge the Committee to ensure that the CAFO rules

are implemented and enforced fairly in Maryland and across the nation. Early indications are that other regions of EPA are not requiring the same level of CAFO permit application by poultry operators as is the Region III office.

Technical Service Providers Must Be Local

Farmers seek advice and technical assistance from individuals who they know to be knowledgeable and understand the needs of agriculture. There is a core group of experts from Cooperative Extension, crop consultants and local soil conservation districts that have earned the trust of Maryland farmers. We ask that the Bay Program also recognize these organizations as the delivery system for agricultural programs. We strongly oppose diverting federal and state funds to non-traditional service providers, it is not seen by the agricultural community as a way to expand activities; instead it dilutes an already short supply of technical support for agriculture.

Sustainable Agriculture

We often hear the term sustainable agriculture, and it means something different to about everyone who uses the term. I would like to suggest that sustainability involves maximizing yields to meet future nutritional needs while decreasing impacts on the environment. If farming does not provide a reasonable income to the farmer, it cannot be sustained. I believe the Bay Program documentation clearly demonstrates that a well managed farm is far better for the Bay than urbanization. The agricultural community maintains its willingness to work with Congress, the Governor, the Bay Program and all other interested parties to do our part to clean up the Bay. We ask for your support for adequate technical assistance and an understanding for the needs of economically viable family farms.

Senator CARDIN. Thank you, Mr. Hutchison.

I appreciate all three of your testimonies.

Agriculture is a critical industry to Maryland and this entire region. It is usually ranked No. 1 as far as the economic importance to our State.

I could not agree with you more about your statement that Maryland farmers are willing to do more to protect and restore the Chesapeake Bay if the programs are reasonable, economically feasible, based on sound science, and equal to the efforts being made by other sources of bay nutrients. I think that should be the framework in which we operate. So I applaud you for that.

I also want to compliment the agricultural industry in this region because I think they have been very aggressive in working with us as partners to try to come up with best practices, helped us with the farm bill, the conservation provisions in the farm bill to try to provide ways in which we can make progress.

I guess if you care to respond—if Congress or EPA decided that it wanted to regulate agricultural nutrient runoff more aggressively and broadly, how do you think that burden should be shared? Do you have a view as to the best way for us to try to get a handle on it in a fair manner?

Mr. HUTCHISON. I certainly have some thoughts. I certainly do not know that I have the answer. But to be honest, at this point in time, I do not know what we can do that we have not already adopted at this point. As I said, I think there are new things coming along. Some of those, such as the biotechnology will not have any public sector cost to it. I think that would be borne entirely by the farmer. But I do think there are things such as the GreenSeeker, the poultry litter injection unit that was demonstrated about 10 days ago at the Y. Those things have tremendous costs to them to the farmer and limited use, and it might be very well to help fund that.

Certainly the research for such things as the slow-release nitrogen, slow-release phosphorus products—and that is ongoing right now. I do not think that needs to be stepped up, but that needs to be proven whether there is an economic benefit or an environmental benefit, and if it is strictly an environmental benefit, then there may need to be some help to use those products. Currently my limited research on my farm has shown that there is no economic benefit to it. It is kind of a tradeoff. But if it proves that it is good for the bay, then it would be certainly a legitimate tradeoff.

I do think that farmers in general—not in general—all farmers look at the environment and want it to be better than it was when they started on their farm. They want to hand it down to their children in better shape, not just the farms themselves, but the total environment.

But there is only so much cost burden that we can share. So I do think that increased subsidies—that is not the right word—cost-share programs are appropriate, and I do point out in the testimony there that I think there are $91 million that have been spent by the Government and $13 million matching by the farmers. So we do have a cost to pay, and I think that is probably appropriate. But I think it needs to be remembered that we do have to bring money out of our own pocket to do that, and I think there should

be some help in some of these things that are questionable at this point.

Senator CARDIN. Well, there are certainly some best practices that will actually help the farming economy, but there are others that have to be shared in a fair manner. I appreciate that.

Mr. Fox, I just want to make sure the record is clear on the impact to the goals we are trying to accomplish. I am looking at your March report that you referred to, I think, early in your presentation on pages 24 and 25. You have a pie chart there that looks at nitrogen, phosphorus, and sediment as far as the industries and the relative responsibility on pollution in the bay. I just want to make sure that this is accurate from the best information that you have today because this will be one of the issues that will guide us. If you would just go through that with us briefly, I would appreciate it.

Mr. FOX. Yes, Mr. Chairman. As I go through this, I will start with the caveats that you expect, and that is that this is the gross summary bay-wide assessments of the loads from different sources. When you look at individual watersheds, the breakdown is a little bit different. And there are subcategories within all of these categories that, of course, are not captured in this as well, and I will mention a couple of those.

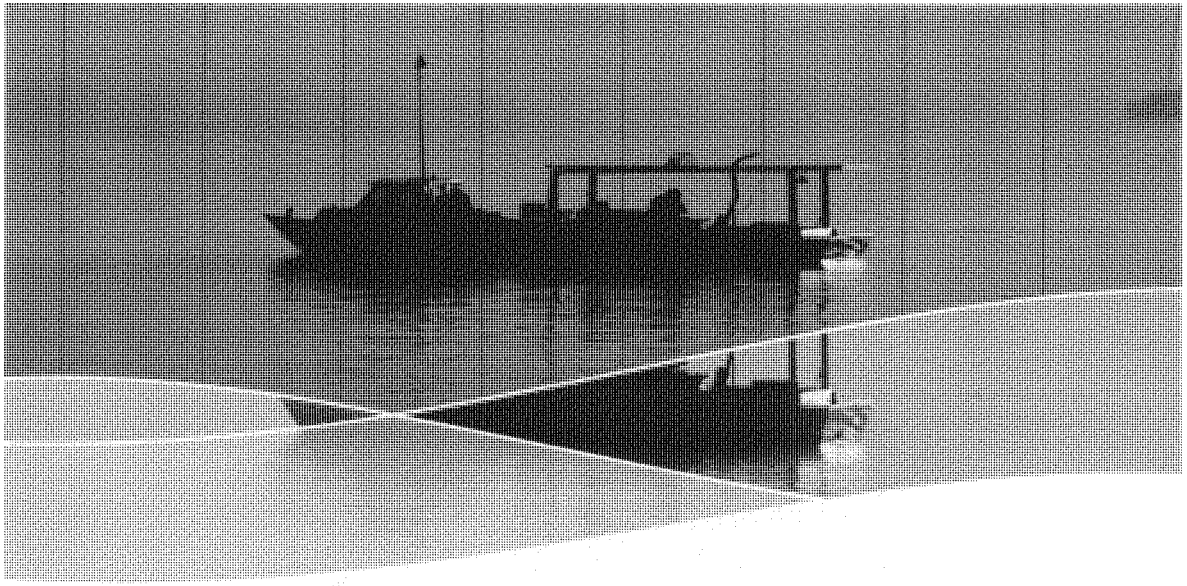
What it says is that for the total nitrogen loads to the bay, the relative responsibility for agriculture is estimated at 42 percent. The wastewater side, which includes publicly owned and privately owned wastewater treatment plants, is 20 percent. Runoff from urban and suburban sectors is 16 percent, and importantly, that is obviously a growing percentage. And then the atmospheric contribution is 22 percent on the nitrogen side. And this comes chiefly from automobiles and powerplants, fossil fuel combustion.

On the phosphorus side, a very similar picture for agriculture at 46 percent; wastewater at 22 percent; urban/suburban runoff at 32 percent.

And then, of course, on the sediment side, the number is very significant for agriculture, and that is estimated at 76 percent with the urban and suburban at 24 percent. We do not find significant sediment loads from wastewater treatment plants or atmospheric sources.

Senator CARDIN. Without objection, we will include the report in our committee record for today's hearing.

[The information referred to follows:]



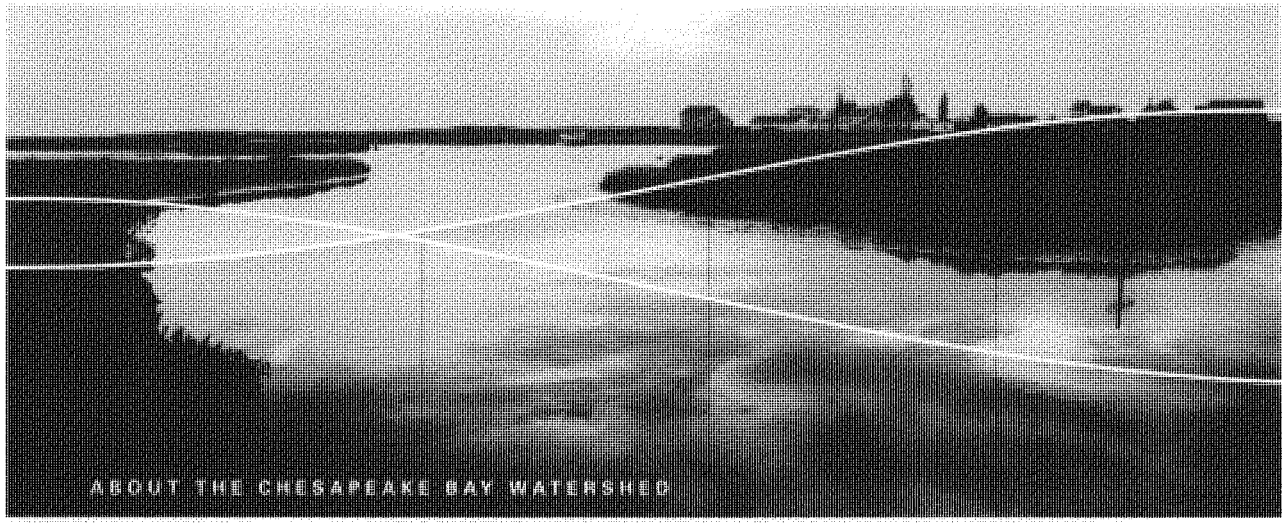
Bay Barometer

A Health and Restoration Assessment of the Chesapeake Bay and Watershed in 2008

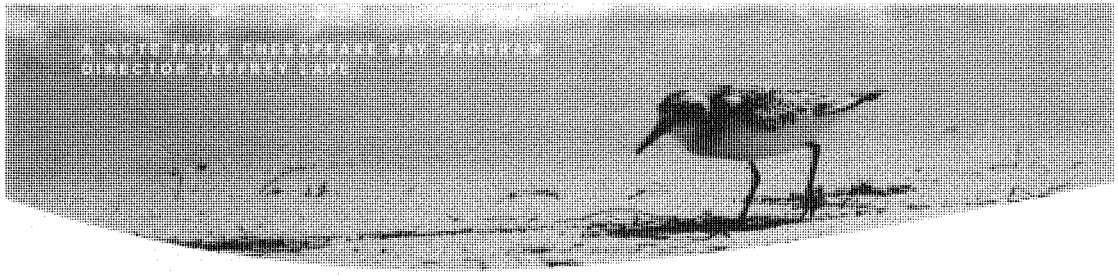
CBP/TRS 293-09 EPA-903-R-09-001 March 2009

Chesapeake Bay Program
A Watershed Partnership

www.chesapeakebay.net



About half the water in the Chesapeake Bay is from the Atlantic Ocean. The rest drains into the Bay from an enormous 64,000-square-mile watershed. The Chesapeake Bay watershed includes parts of six states – Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia – and the entire District of Columbia. The Chesapeake's land-to-water ratio is 14:1, the highest of any coastal water body in the world. The Bay watershed is home to almost 17 million people. About 150,000 people move to the area each year. Experts predict that the population will increase to nearly 20 million by 2030. Everyone in the watershed lives just a few minutes from one of the 100,000 streams and rivers that drain into the Bay. Each of these waterways is a pipeline from communities to the Bay. Of the 50 largest tributaries that flow into the Bay, just three deliver about 80 percent of Bay's fresh water: the Susquehanna River (48 percent), the Potomac River (19 percent) and the James River (14 percent). During the 1600s, 95 percent of the watershed was forested. Now about 58 percent is forest. The rest of the land has been developed for other uses, such as agriculture and urban and suburban lands.



Chesapeake Bay Program

A Watershed Partnership

The Chesapeake Bay Program is a unique regional partnership that has coordinated and conducted the restoration of the Chesapeake Bay since 1983. Partners of the Chesapeake Bay Program include the states of Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia; the District of Columbia; the Chesapeake Bay Commission, a tristate legislative body; the Environmental Protection Agency, representing the federal government; the U.S. Department of Agriculture; and advisory groups of citizens, scientists and local government officials.

Contact Us: *Chesapeake Bay Program*
410 Severn Avenue, Suite 109, Annapolis, MD 21403
1(800) YOUR BAY / www.chesapeakebay.net

At the Chesapeake Bay Program, we are fortunate to have the talented people and the remarkable science to provide an intimate look at our nation's largest estuary. This assessment's rich reporting on ecosystem conditions and restoration actions reveals where we are and, more important, how far we have to go.

While there are many individual success stories behind the collective numbers – work that in most cases will take time to influence water quality – the sobering data in this report mostly reflect only marginal shifts from last year's results. This affirms the need to take bolder actions and involve a wider network to achieve sharp improvements in our Bay Barometer readings.

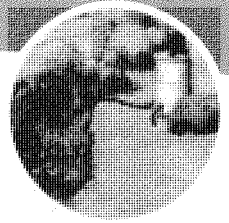
We all are understandably impatient for more rapid progress.

Among the steps being taken by the program, its partners and its Executive Council are:

- Setting tough pollution caps throughout the watershed with accompanying action plans
- Reorganizing the program to make it more strategic, effective and accountable for meeting its goals
- Continuing partner initiatives as "champions" for innovation and implementation
- Setting two-year milestones to better gauge and motivate progress toward an overall deadline
- Enlisting an external evaluator to critically assess program operations and improve efficiency

And that's just a start. From the White House to statehouses to town halls, commitments are being made to take strong actions to stem pollution impacting the Chesapeake Bay and its tributaries.

We all have a role in restoring the beauty and bounty of this treasured resource. This report features a new chapter that shows how we can all help. Together, we can and will speed the day when the wonders of the Bay are fully enjoyed by this and future generations.



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EXECUTIVE SUMMARY

The Chesapeake Bay is one of the most extraordinary places in America. The unique estuary and its 64,000-square-mile watershed have tremendous ecological, historic, cultural, economic and recreational value to the region and the entire country.

For more than 25 years, the partners of the Chesapeake Bay Program have worked to protect and restore the Bay and its watershed. Goals are set for the health of the Bay and the restoration measures needed to return the ecosystem to a healthy state. *Bay Barometer: A Health and Restoration Assessment of the Chesapeake Bay and Watershed in 2008* is the annual review of the partnership's progress.

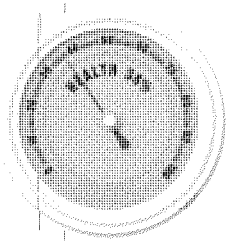
The Chesapeake Bay and its tributaries are unhealthy primarily because of pollution from excess nitrogen, phosphorus and sediment entering the water. The main sources of these pollutants are agriculture, urban and suburban runoff, wastewater, and airborne contaminants.

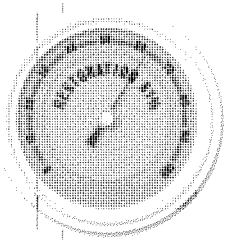
Despite small successes in certain parts of the ecosystem and specific geographic areas, the overall health of the Chesapeake Bay did not improve in 2008. The Bay continues to have poor water quality, degraded habitats and low populations of many species of fish and shellfish. Based on these three areas, the overall health averaged 38 percent, with 100 percent representing a fully restored ecosystem.

New restoration programs and projects were put in place in 2008, but resulted in only incremental gains toward goals. The indicators for restoration averaged 61 percent, with 100 percent meaning that all measures needed for a restored Bay have been implemented.

One of the greatest challenges to restoration is continued population growth and development, which destroys forests, wetlands and other natural areas. The impact of human activity is overwhelming nature and offsetting cleanup efforts.

Because the watershed's 17 million residents have a tremendous impact on its health, a section called "How You Can Help" was added to this report. It shows simple actions that people can take to help protect nature and reduce pollution. The Chesapeake Bay will only be restored through this type of collective effort.





FACTORS IMPACTING THE BAY AND WATERSHED

Annual rain and snowfall affect how much water flows in rivers. The levels of pollution entering the Bay each year generally correspond with the volume of water that flows from its tributaries.

River Flow: Total river flow to the Bay during the 2008 water year (October 2007-September 2008) was 37.5 billion gallons per day (BGD). This is 3.5 BGD less than 2007 and 10 BGD less than the 47.2 BGD average flow from 1938-2008.

Nitrogen: Preliminary estimates indicate that 291 million pounds of nitrogen reached the Bay during 2008. This is 13 million pounds less than 2007 and 54 million pounds less than the 345 million pound average load from 1990-2008.

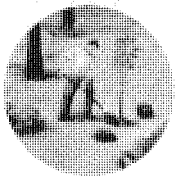
Phosphorus: Preliminary estimates indicate that 13.8 million pounds of phosphorus reached the Bay during 2008. This is similar to 2007 and 7.5 million pounds less than the 21.3 million pound average load from 1990-2008.

Sediment: Preliminary estimates indicate that 3.3 million tons of sediment reached the Bay during 2008. This is 700,000 tons more than 2007 and 800,000 tons less than the 4.1 million ton average load from 1990-2008.

HOW YOU CAN HELP

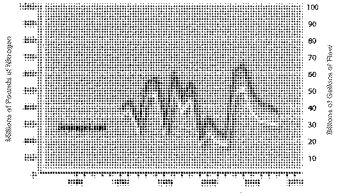
Almost 17 million people live in the Chesapeake Bay watershed. The actions that residents take everyday affect nature and impact the health of local creeks, streams and rivers, and ultimately the Bay. The effort to create clean water in communities and restore the Chesapeake cannot be successful without the active involvement of citizens throughout the watershed. Here are some key ways to help:

- Pick up after your pet.
- Volunteer for a watershed group.
- Don't fertilize your lawn.
- Install a rain barrel and rain garden.
- Use phosphorus-free dish detergent.
- Drive your car less.
- Plant native trees and shrubs.



For more details and ideas, visit www.chesapeakebay.net/helpthebay.aspx.

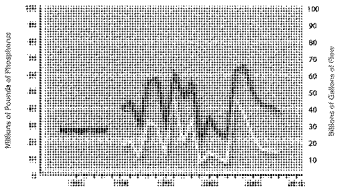
Nitrogen Loads Reaching Chesapeake Bay*



*Preliminary Data River Flow Nitrogen Load

Data and methods: www.chesapeakebay.net/status_nitrogen.aspx

Phosphorus Loads Reaching Chesapeake Bay*



*Preliminary Data River Flow Phosphorus Load

Data and methods: www.chesapeakebay.net/status_phosphorus.aspx

HEALTH – 38 PERCENT

The Chesapeake Bay ecosystem remains severely degraded. The Bay's health is measured by studying water quality, habitats, the lower food web and fish and shellfish. When all the goals for these areas are reached, it should mean a restored Bay. In 2008, the Chesapeake Bay was only at 38 percent of the desired health, which was the same as 2007. An increase in tidal tributary segments impaired due to chemical contaminants and a drop in the blue crab population were primary reasons for a lower score.

Water Quality – 21 percent

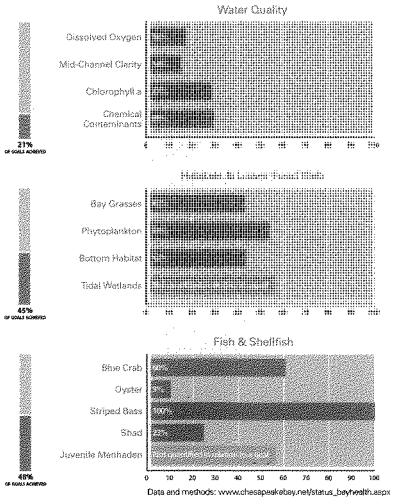
Water quality is the most important measure of the Chesapeake Bay's health. In 2008, water quality was again very poor, meeting only 21 percent of the goals, the same as 2007. Pollution led to murky water and algae blooms, which blocked sunlight from reaching bay grasses and created low levels of oxygen for aquatic life. Chemical contaminants impaired more water in 2008, resulting in a 6 percent decrease in that goal area.

Habitats and Lower Food Web – 45 percent

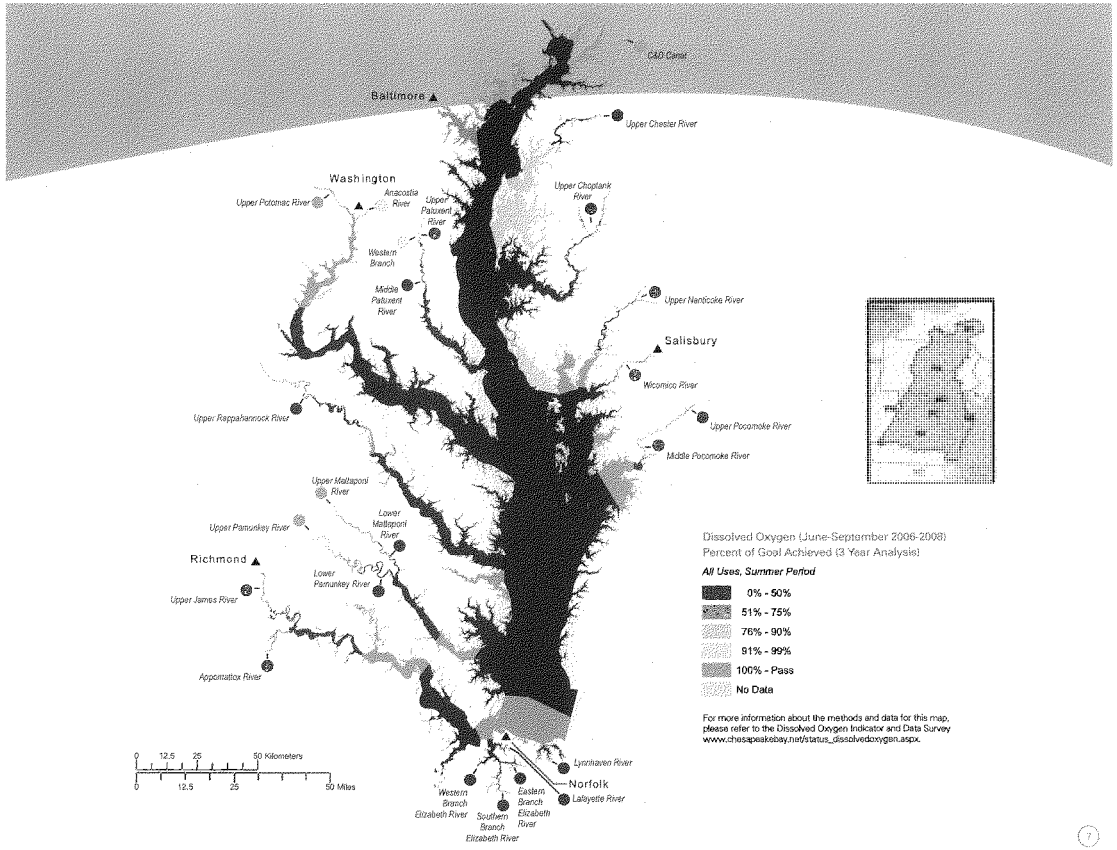
Overall, the vital habitats and lower food web that support life in the Chesapeake Bay continued to be in bad shape in 2008, meeting 45 percent of the goals, the same as 2007. The positive news is that there was a 7 percent gain toward the goal for underwater bay grasses. On the negative side, goal achievement for algae fell 3 percent.

Fish and Shellfish – 48 percent

Most fish and shellfish populations in the Bay remain far below desired levels, and 2008 brought a 2 percent decrease in this goal area. This setback was driven by a drop of 23 million in the population of spawning-age blue crabs, which lowered progress toward the species goal by 11 percent. Oyster and shad populations remained at low levels.

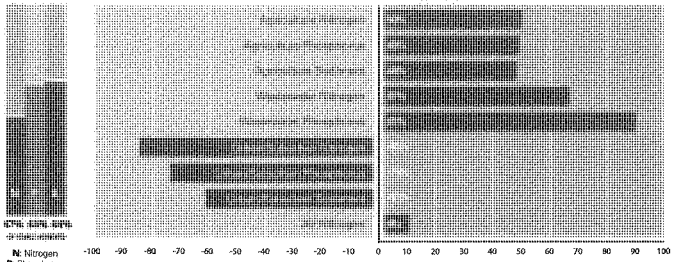


Data and methods: www.chesapeakebay.net/status_bayhealth.aspx


C&O Canal
Baltimore
Upper Chester River
Washington
Upper Potomac River
Anacostia River
Upper Patuxent River
Western Branch
Middle Patuxent River
Upper Choptank River
Upper Nanticoke River
Salisbury
Wicomico River
Upper Pocomoke River
Middle Pocomoke River
Upper Rappahannock River
Upper Mattaponi River
Lower Mattaponi River
Upper Pamunkey River
Lower Pamunkey River
Richmond
Upper James River
Appomattox River
Lynnhaven River
Norfolk
Lafayette River
Western Branch Elizabeth River
Southern Branch Elizabeth River
Eastern Branch Elizabeth River
0 12.5 25 50 Kilometers
0 12.5 25 50 Miles
Dissolved Oxygen (June-September 2006-2008)
Percent of Goal Achieved (3 Year Analysis)
All Uses, Summer Period
0% - 50%
51% - 75%
76% - 90%
91% - 99%
100% - Pass
No Data
For more information about the methods and data for this map, please refer to the Dissolved Oxygen Indicator and Data Survey www.chesapeakebay.net/status_dissolvedoxygen.aspx.

RESTORATION – 61 PERCENT

To restore the Chesapeake Bay and its watershed, many measures must be put in place to reduce pollution, restore habitats, manage fisheries, protect watersheds and foster stewardship. Progress toward putting restoration measures in place continued in 2008, with a 4 percent gain, bringing the partnership to 61 percent of its goals. Population growth and development continue to hamper pollution-reduction efforts and urban and suburban runoff remains the only source of pollution that is increasing. Steady progress was seen in several areas, and the goal for land preservation has been met.



N: Nitrogen
P: Phosphorus
S: Sediment

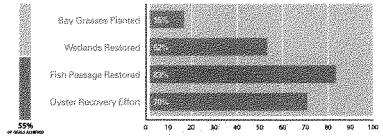
Data and methods: www.chesapeakebay.net/status_restoration.aspx

Reducing Pollution – 58 percent

Chesapeake Bay Program partners are focused on reducing pollution from the four primary sources: agriculture, wastewater, urban and suburban runoff, and air pollution. Based on available data, scientists project that 58 percent of the pollution reduction efforts needed to achieve the goals have been implemented since 1985, which is a 1 percent increase from 2007.

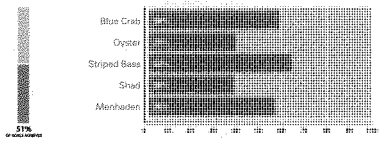
Restoring Habitats – 55 percent

Efforts to restore habitats throughout the watershed achieved modest gains in 2008, with progress toward the overall goal at 55 percent, an 11 percent increase from 2007. There were incremental gains in bay grasses planted, wetlands restored and fish passage restored. A goal was set for oyster recovery work, and achievement is at 70 percent.



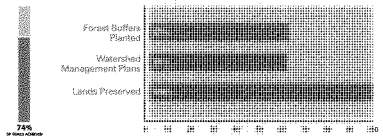
Managing Fisheries – 51 percent

Overall work to develop ecosystem-based fisheries management plans for blue crabs, oysters, striped bass, Atlantic menhaden and American shad stands at 51 percent, just a minimal gain from 2007. The score was increased by new restrictions on harvesting blue crabs and advancements in oyster research and aquaculture.



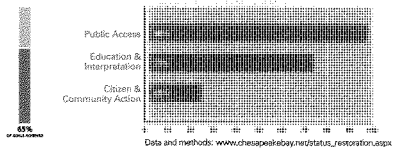
Protecting Watersheds – 74 percent

Progress was made toward protecting of the thousands of smaller watersheds in the region during 2008, with a 3 percent gain toward the overall goal. Last year, the partnership met its goal for preserving 7 million acres of land. Work to plant forest buffers and develop watershed management plans also increased the score.



Fostering Stewardship – 65 percent

Programs to foster the public's stewardship of the Chesapeake Bay and its watershed resulted in a score of 65 percent. A 13 percent gain toward the goal for education contributed to the overall increase. To gauge citizen action, an effort was launched to measure volunteerism throughout the watershed.



Data and methods: www.chesapeakebay.net/status_restoration.aspx

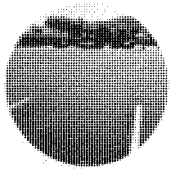
FACTORS

Everything that happens on land has an impact on the water. The man-made pressures on the Chesapeake Bay and its watershed began more than 400 years ago, when the first European colony was founded at Jamestown, Virginia, and Captain John Smith led expeditions around the estuary. During the four centuries that followed, the human population swelled, forests were chopped down, industrial activity ensued, fish and shellfish were harvested, towns and cities were built, and toxic chemicals were released into the environment. These factors disrupted the natural functioning of the entire ecosystem and led to a tremendous decline in the Bay's health. Today, human activity continues to drive the primary sources of pollution, which are agriculture, urban and suburban lands, wastewater, and air pollution.

AGRICULTURE

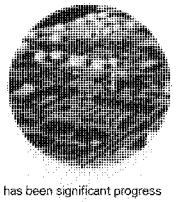
Agriculture covers about 25 percent of the watershed, representing the largest intensively managed land use. There are an estimated 87,000 farms covering about 8.5 million acres. Agriculture is the number one source of pollution to the Bay. Improperly applied fertilizers and pesticides flow into creeks, streams and rivers, carrying excess nitrogen, phosphorus and chemicals into the Chesapeake Bay. Tilling cropland and irrigating fields can cause major erosion. Additionally, the nutrients and bacteria found in animal manure can seep into groundwater and runoff into waterways.

URBAN AND SUBURBAN LANDS



Human development, ranging from small subdivisions to large cities, is a major source of pollution for the Chesapeake. In fact, because of the region's continued population growth and related construction, runoff from urban and suburban lands is the only source of pollution that is increasing. These areas are covered by impervious surfaces – such as roads, rooftops and parking lots – that are hard and don't let water penetrate. As a result, water runs off into waterways instead of filtering into the ground. This runoff carries pollutants including lawn fertilizer, pet waste, chemicals and trash. Septic systems release pollution that eventually ends up in the water. Developed areas also split up forests, decreasing their filtering capacity.

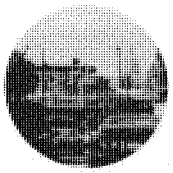
WASTEWATER



There is a tremendous volume of sewage that must be processed in the watershed. The technology used by the 483 major municipal and industrial wastewater treatment plants has not removed enough pollution, particularly nitrogen and phosphorus. Upgrading these facilities so they can remove more pollution from the water is extremely expensive and takes time. While there has been significant progress in improving treatment at many wastewater plants, numerous facilities still use old technology. Also, population growth is increasing the need for wastewater treatment, causing some facilities to be expanded.

AIR POLLUTION

When pollution is released into the air, it eventually falls onto land and water. Even larger than the Chesapeake Bay's watershed is its airshed, the area from which pollution in the atmosphere settles into the region. This airshed is about 570,000 square miles, or seven times the size of the watershed. Nitrogen and chemical contaminants – such as mercury and PCBs – from air pollution contribute to poor water quality in the region, and about half of these pollutants come from outside the watershed. Air pollution is generated by a variety of sources, including power plants, industrial facilities, farming operations and automobiles and other gas-powered vehicles.

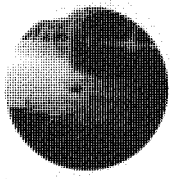


OTHER

There are several other factors that impact the overall health of the ecosystem. These include:

- Climate Change: The Chesapeake region has already begun to see the effects of global climate change in the form of sea level rise and higher water temperatures. Scientists predict that climate change could also cause a decrease in underwater grasses, more "dead zones" of low oxygen, more annual precipitation and a resulting increase in the flow of pollution, fewer wintering waterfowl, and a change in the types of plants and animals that live in the area.
- Invasive Species: Invasive species are animals and plants that are not native to their habitat and negatively affect the invaded ecosystem. Once an invasive species population is established it is unlikely to be completely eradicated. In the Bay region there are more than 200 invasive species thought to cause serious problems – the mute swan, nutria, phragmites, purple loosestrife, water chestnut and zebra mussels are the species that pose the greatest threats.
- Fisheries Harvest: The Chesapeake Bay and its tributaries have historically been rich grounds for commercial and recreational fisheries. Demand for seafood has driven these commercial fisheries, and crabbing and angling have long been popular activities for residents. But these fisheries have put tremendous pressure on the population of key Chesapeake species, such as blue crabs and oysters.

RIVER FLOW AND POLLUTANT LOADS



Importance: Each day, billions of gallons of fresh water flow through thousands of streams and rivers that eventually empty into the Chesapeake Bay. That water also carries polluted runoff from throughout the watershed. The amount of water flowing into the Bay from its tributaries has a direct impact on how much pollution is in the estuary – generally as river flow increases, it brings more nitrogen and phosphorus to the Bay. The volume of river water flowing into the Bay also affects the saltiness (salinity) of Bay waters. In addition, fast-moving and turbulent river flow mixes in oxygen from the air, which is beneficial for aquatic life. Years with low or high amounts of precipitation can result in changes to pollution levels in the Bay, but not mean the health of the watershed is improving or declining.

To calculate the loads of nitrogen and phosphorus flowing to the Bay, scientists use a combination of water samples and computer modeling. Whenever possible and practical, samples from rivers and wastewater pipes are used to measure pollution levels. Using this technique, pollution loads can be calculated for almost 80 percent of the watershed. For the remaining area, computer modeling is used to calculate pollution loads.

Status: River Flow: Total river flow to the Bay during the 2008 water year (October 2007-September 2008) was 37.5 billion gallons per day (BGD). This is 3.5 BGD less than 2007 and 10 BGD less than the 47.2 BGD average flow from 1938-2008.

Nitrogen: Preliminary estimates indicate that 291 million pounds of nitrogen reached the Bay during 2008. This is 13 million pounds less than 2007 and 54 million pounds less than the 345 million pound average load from 1990-2008.

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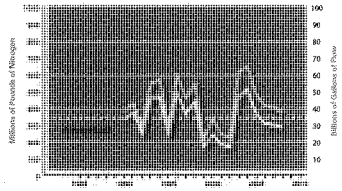
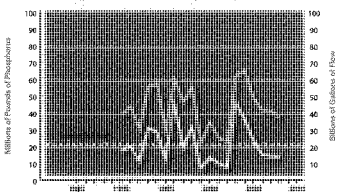
Nitrogen Loads Reaching Chesapeake Bay*



*Preliminary Data River Flow Nitrogen Load

Data and methods: www.chesapeakebay.net/status_nitrogen.aspx

Phosphorus Loads Reaching Chesapeake Bay*



*Preliminary Data River Flow Phosphorus Load

Data and methods: www.chesapeakebay.net/status_phosphorus.aspx

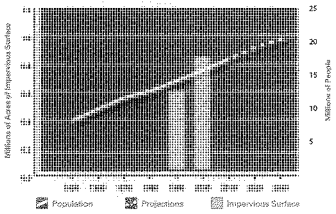
LAND USE

How humans use the land has the greatest impact on the Chesapeake Bay and local waterways. Natural areas like forests and wetlands have a positive effect on water quality, while areas developed for farming or cities generally have a negative impact. The decline of the Chesapeake Bay is directly linked to the rise in population of the watershed – since 1950 the number of residents has doubled. Projections through 2030 show continued population growth, loss of natural areas and increases in urban development, all of which are challenges to protecting and restoring the Chesapeake.

Even more influential than population growth is the corresponding development. People are moving into sprawling suburbs and living in bigger houses on larger lots, causing forests, farms and other valuable lands to be transformed into subdivisions, shopping centers and parking lots. This land conversion severely impacts the health of streams, rivers and the Bay. Impervious surfaces such as roads and rooftops do not allow water to filter into the ground. Instead, rainfall runs off, picking up pollution and quickly carrying it into waterways. From 1990 to 2000, impervious surfaces increased by 41 percent – a rate five times greater than the 8 percent rate of population growth during that time.

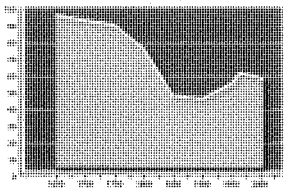
Forests are the most beneficial use of land for Bay water quality. They capture, filter and retain water, thereby reducing pollution and improving water quality. Forests also absorb air pollution and retain up to 85 percent of the nitrogen from sources such as automobiles and power plants. Forested areas reduce erosion, control flooding and provide habitat for wildlife. In the 1600s, forests covered 95 percent of the watershed. Now only 58 percent of the watershed is forested, and development is reducing forests at the rate of 100 acres per day. Also because of development, forested areas are being split into smaller parcels, which reduces their ability to improve water quality and provide wildlife habitat.

Population and Impervious Surface



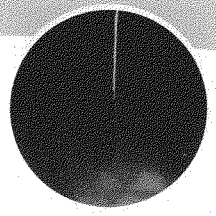
Data and methods: www.chesapeakebay.net/status_population.aspx

Percent of Watershed with Forest



Data and methods: www.chesapeakebay.net/status_watershedforests.aspx

CHAPTER 7 ECOSYSTEM HEALTH
HEALTHY DAY
• Cities and communities
• Consumption and production
• Climate change
• Ecosystems and biodiversity
• Chemicals and waste
• Governance
• Health and well-being
• Sustainable development in Europe



WATER QUALITY

For the Chesapeake Bay to be healthy and productive, the water must be safe for people and must support aquatic life, such as fish, crabs and oysters. The water should be fairly clear, have enough oxygen, contain the proper amount of algae and be free from chemical contamination.

However, the indicators in this section show that water quality in the Bay remains extremely poor because of pollution from nitrogen, phosphorus, sediment and chemicals. Rain causes these pollutants to runoff into local streams, creeks and rivers and the Bay itself. To improve water quality, the flow of pollution must continue to be reduced. This will increase water clarity and oxygen levels in the Bay, and will decrease harmful algae blooms and chemical contaminants.

Overall, Bay water quality is at 21 percent of the goal.

For more information, visit www.chesapeakebay.net/waterquality.aspx.

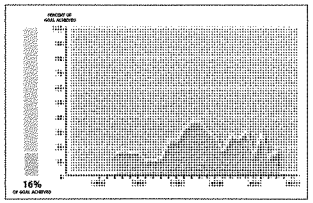
To improve water quality, the flow of pollution must continue to be reduced.

DISSOLVED OXYGEN

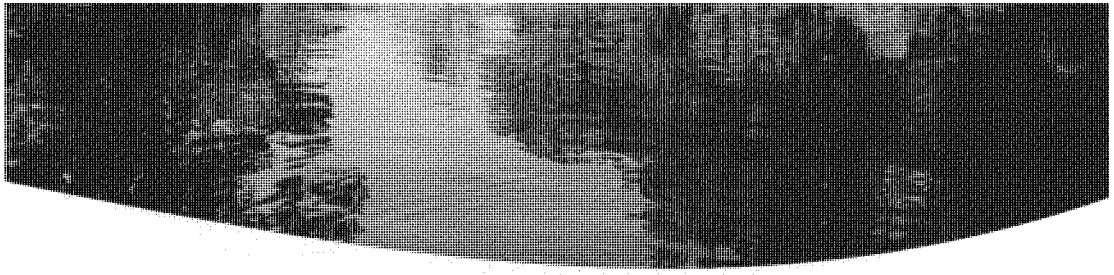
Importance: When oxygen is in water, it is in a dissolved form. The Chesapeake Bay's fish and shellfish need certain levels of oxygen to survive and thrive. The necessary amount of dissolved oxygen varies by species, season and location in the Bay. Generally, higher levels of oxygen are needed in shallow waters during the spring, when aquatic animals spawn. Slightly lower levels of oxygen are acceptable at other times of the year, particularly in deeper waters.

Status: The goal is for 100 percent of the tidal tributaries and the Chesapeake Bay to meet Clean Water Act standards for dissolved oxygen. When assessing water quality, regulators examine conditions from the past three years to adjust for annual weather-driven fluctuations. Data gathered from 2006 to 2008 indicate that about 16 percent of the combined volume of open-water, deep-water and deep-channel water of the Bay and its tidal tributaries met dissolved oxygen standards during the summer months. This is an increase of 4 percent from last year's assessment (also see dissolved oxygen map on page 7).

Dissolved Oxygen



Standards attainment: data represent 3 year period (data year and preceding 2 years).
Data and methods: www.chesapeakebay.net/status_dissolvedoxygen.aspx

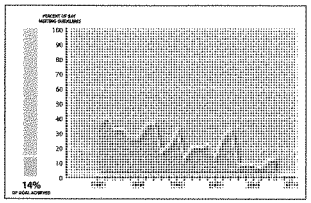


WATER CLARITY

Importance: Clear water is a characteristic of a healthy Chesapeake Bay. Good water clarity is one of the most important factors in the growth of underwater grasses. These grasses provide vital habitat for a number of aquatic animals. Clear water allows sunlight to reach the plants, providing energy for them to grow, and enables fish to see prey and avoid predators. Currently, the flow of pollution into the Bay causes light-blocking algae to grow and clouds the water with particles of dirt.

Status: The goal is for 100 percent of the Chesapeake Bay to meet guidelines for water clarity. A device called a Secchi disk is used to measure water clarity and the depth to which light penetrates the water column during the growing season for underwater bay grasses. Last year, 14 percent of tidal waters met or exceeded thresholds for water clarity. This was a slight increase from 2007, when about 12 percent met guidelines.

Water Clarity



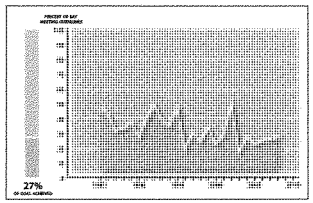
Data weighted by respective salinity zone.
Data and methods: www.chesapeakebay.net/status_clarity.aspx

CHLOROPHYLL A

Importance: Scientists study chlorophyll *a* to determine the amount of algae present in the Chesapeake Bay. Algae make up the foundation of the food chain, supporting most aquatic animals including oysters and fish. The right amount of algae is needed for balance in the ecosystem. Too much nitrogen and phosphorus pollution can cause algae blooms that block sunlight from reaching underwater grasses, reducing habitat and the oxygen necessary for life. Harmful algae blooms are an annual problem in the Bay and its tributaries.

Status: The goal is for 100 percent of Chesapeake Bay tidal waters to be below certain threshold concentrations of chlorophyll *a* that are acceptable to underwater bay grasses. Because pollution, weather and water temperature all affect chlorophyll *a*, levels vary greatly by year, season and location. Last year, 27 percent of tidal waters had chlorophyll *a* concentrations below the threshold. This is an increase of 1 percent from 2007.

Cholorophyll A



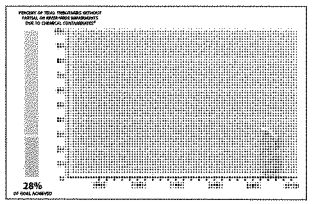
Data and methods: www.chesapeakebay.net/status_chlorophylla.aspx

CHEMICAL CONTAMINANTS

Importance: Toxic chemicals found in the water, sediment and fish of the Chesapeake Bay's tidal tributaries can have adverse effects on the ecosystem and human health. Chemical contaminants such as polychlorinated biphenyls (PCBs) can accumulate in the tissues of fish and this can provide an indication of the overall presence of these substances in the ecosystem. These chemicals can build up in certain species of fish to levels that can potentially be harmful to humans who consume them.

Status: The Chesapeake Bay Program's goal is for 100 percent of tidal tributaries to be unimpaired by chemical contaminants such as metals, PCBs and tributyltin. Last year, 25 of the 89 monitored tidal segments (28 percent) were unimpaired by chemicals. This represents a 6 percent decrease from 2007. The other 64 segments contained a partial or full impairment. There may be little positive change seen in the short term since a majority of impaired waterways have persistent problems with PCBs in fish tissues.

Chemical Contaminants



*Impairments as determined by Virginia, Maryland and the District of Columbia under Clean Water Act Requirements.
Data and methods: www.chesapeakebay.net/status_chemicalcontaminants.aspx

HABITATS AND THE LOWER FOOD WEB

For life to thrive in the Chesapeake Bay, high-quality food sources and habitats are required. Clams and worms need an unpolluted environment at the bottom of the Bay. Abundant underwater grasses and wetlands are vital to juvenile fish and crabs. For all aquatic life to flourish, the algae that make up the foundation of the food web must be of the proper type and in the right amounts. The health and abundance of these animals and habitats are gauges of the Bay's health.

The indicators in this section show that more underwater grasses and wetlands are needed both for habitats and for their ability to filter pollution. Bottom habitat in the Bay and the health of algae must improve.

Overall, 45 percent of the goals for Bay habitats and the lower food web have been achieved.

For more, visit www.chesapeakebay.net/habitats.aspx and www.chesapeakebay.net/lowerfoodweb.aspx.

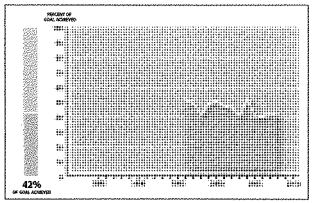
For life to thrive in the Chesapeake Bay, high-quality sources of food and types of habitat are required.

BOTTOM HABITAT

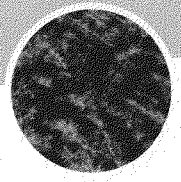
Importance: The Bay's bottom is home to many species including worms, small fish and shellfish such as clams, oysters and mussels. These bottom-dwelling creatures are especially sensitive to increased pollution and decreased oxygen. These species serve as food for bottom-feeding fish and crabs. The health of these creatures is a good indicator of long-term conditions in the bottom habitat and the Bay overall, because they do not move great distances and have certain predictable responses to environmental stresses.

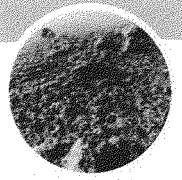
Status: A measurement called the Index of Biotic Integrity is used to rate the health of bottom habitats on a scale of 1 to 5. Each year, 250 random samples are collected throughout the Bay and its tributaries. The goal is for all scores to be at least a 3. In 2008, 42 percent of the area of the Bay and its tidal tributaries met the restoration goals, which is the same as the previous year. Low levels of dissolved oxygen are the primary cause of bottom habitat degradation.

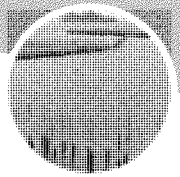
Bottom Habitat



Data and methods: www.chesapeakebay.net/status_bottomhabitat.aspx





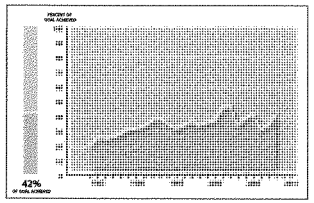


BAY GRASSES

Importance: Underwater bay grasses serve many essential ecological functions and are among the most closely monitored habitats in the Bay. Grasses provide critical shelter to many key species such as young striped bass and blue crabs, improve water clarity by helping sediment settle to the bottom, add oxygen to the water and reduce shoreline erosion. Bay grass abundance is an excellent barometer of the health of the Bay because these grasses depend on good local water quality and provide significant benefits to aquatic life.

Status: The goal is to have 185,000 acres of underwater bay grasses in the Chesapeake Bay by 2010, which represents the documented acreage found from the 1930s until the present. Last year, there were 76,861 acres of bay grasses throughout the Bay, which was 42 percent of the goal and an increase of 11,984 acres from 2007. In 2008, grasses in the Upper Bay covered about 22,954 acres (97 percent of the area's 23,630-acre goal). Middle Bay grasses covered 34,521 acres (30 percent of the 115,229-acre goal for the area), and grasses in the Lower Bay covered 19,386 acres (42 percent of the area's 46,030-acre goal).

Bay Grasses



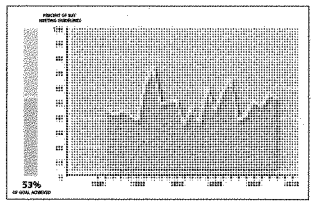
Data and methods: www.chesapeakebay.net/status_baygrasses.aspx

PHYTOPLANKTON

Importance: Algae, or phytoplankton, are especially sensitive to changes in pollution levels, water clarity, temperature and salinity, and therefore serve as an excellent indicator of the health of the Bay's surface waters. While algae also make up the base of the food web in the Bay ecosystem, too much or the wrong type of algae can be detrimental to the overall health of the Bay by decreasing oxygen, blocking sunlight and harming aquatic life. In some cases, algae blooms can negatively impact human health as well.

Status: A measurement called the Index of Biotic Integrity is used to rate the health of phytoplankton on a scale of 1 to 5. Scores are generated using monthly samples taken from 31 stations during the spring and summer. The goal is for all scores to be at least a 3. Last year, 53 percent of the Bay's surface waters met the goal, a decrease of about 3 percent from 2007. Water clarity is currently too poor and pollution levels too high to consistently support healthy phytoplankton communities. Algae blooms are still frequent, harmful algae species are often abundant and algal cells exhibit signs of stress.

Phytoplankton



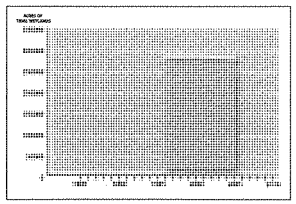
Data and methods: www.chesapeakebay.net/status_phytoplankton.aspx

WETLANDS

Importance: In addition to being places of tremendous beauty, wetlands connect the land to the water. Throughout the Chesapeake Bay, these areas of transition provide unique habitats for a rich diversity of land animals and aquatic life. Wetlands also act as sponges and natural filters by absorbing runoff and removing pollution from water before it enters streams, creeks, rivers and the Bay. But the Chesapeake's wetlands are fragile and threatened by shoreline development, sea level rise and invasive species.

Status: This indicator is used not to track progress toward a goal, but to measure how many acres of tidal wetlands are in the Bay and identify trends. As of 2005, there were approximately 283,946 acres of tidal wetlands. There was a 2,600-acre loss between 1996 and 2005. While the decline is not significant on a baywide scale, certain areas are suffering the losses. For example, at Blackwater National Wildlife Refuge on Maryland's Eastern Shore, scientists have documented losses in wetlands due to sea level rise, land subsidence, coastal erosion and the invasive species nutria.

Wetlands



1984 & 1992 data to be analyzed; expected completion by 2009.
Data and methods: www.chesapeakebay.net/status_totalwetlands.aspx

FISH AND SHELLFISH

For the Chesapeake Bay to be considered restored, there must be healthy and abundant fish and shellfish. Blue crab, oyster, striped bass, shad and menhaden are some of the Bay's most iconic species. These fish and shellfish are an essential part of the region's commercial fisheries, recreational activities, and cultural and culinary identity. They also play critical roles in the Bay's ecosystem and require clean water, ample aquatic habitat and properly managed fisheries to be healthy and reproduce.

However, the indicators in this section reflect that the Chesapeake's fish and shellfish suffer from polluted water, lack of habitat and disease. They also face other challenges, such as overharvesting pressures and reduced food sources.

Overall, 48 percent of the goals have been met for fish and shellfish.

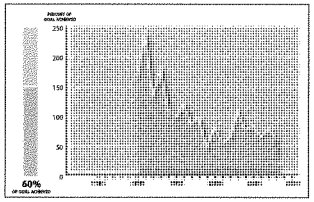
For more, visit www.chesapeakebay.net/fish.aspx and www.chesapeakebay.net/crabsandshellfish.aspx.

BLUE CRAB

Importance: Perhaps no species is more closely associated with the Chesapeake Bay than the blue crab. It is estimated that one-third of the nation's blue crab catch comes from the Bay. Good water quality and adequate habitat, particularly of underwater grasses that provide shelter and food, are essential for the crabs' health and population growth. Harvest restrictions are also required to prevent removal of too large a segment of the population. The species has been impacted by overexploitation, pollution and reduced habitat.

Status: The goal is to have 200 million blue crabs that are at least one year old in the Bay. This abundance of crabs can result in a harvest of 60 million to 65 million pounds each year while still preserving 20 percent of the spawning population. Last year, the population of spawning-age blue crabs in the Bay was 120 million, or 60 percent of the goal. This is a substantial decrease from 143 million in 2007, which was 71 percent of the goal.

Blue Crab Abundance



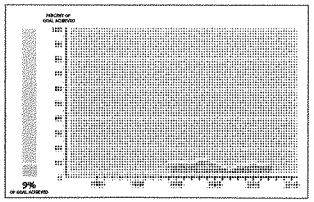
Data and methods: www.chesapeakebay.net/status_bluecrab.aspx

OYSTERS

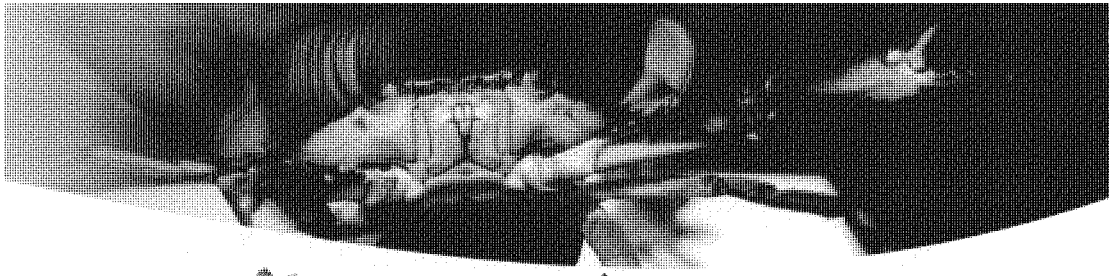
Importance: Oysters join blue crabs as one of the most valuable species in the Chesapeake Bay. These bivalves have an incredible ability to filter water, which increases water clarity. It has been estimated that at their historic population peak, oysters filtered all of the Bay's water in less than one week – it takes about one year for the current population to do so. Oysters have also constituted one of the Bay's most valuable commercial fisheries for more than a century. But historic overharvesting, pollution and the diseases Dermo and MSX have caused a severe decline in oyster numbers.

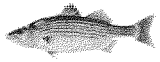
Status: The goal is to achieve at least a tenfold increase in native oysters in the Chesapeake Bay by 2010, based on 1994 levels, which would equal 31.6 billion grams of oyster biomass. Based on the most recent data from 2007, there are 2.73 billion grams of oyster biomass, or about 9 percent of the goal. The 2007 level of oyster abundance was not a significant change from 2006 and is near the baywide average of 9.6 percent from 1994–2007.

Oysters Abundance



Data and methods: www.chesapeakebay.net/status_oyster.aspx



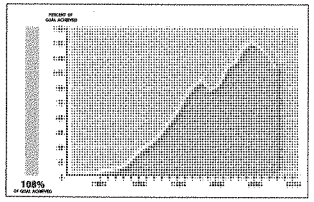


STRIPED BASS

Importance: The Chesapeake Bay is a primary spawning and nursery habitat for striped bass on the Atlantic Coast. Striped bass support one of the most important commercial and recreational fisheries on the Atlantic seaboard. A fishing moratorium during the late 1980s and commercial quotas and recreational harvest limits set since 1990 have restored the stock. However, scientists are concerned about the high prevalence of disease (mycobacteriosis) in the fish and continue to research the problem. Because striped bass are among the Bay's top predators, scientists are also concerned about whether there is enough prey to adequately support the population.

Status: The goal for a restored population of striped bass is to have a spawning stock biomass equal to the averages from 1960-1971, which is 82.7 million pounds of the females. The goal for striped bass has been met: 89.6 million pounds of spawning stock in 2006 is 108 percent of the goal. This is less than the peak of 113 million pounds in 2003 and a measure of 100.2 million pounds in 2005.

Striped Bass Abundance



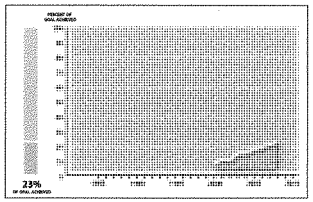
Data and methods: www.chesapeakebay.net/status_stripedbass.aspx

AMERICAN SHAD

Importance: American shad form an important link in the Chesapeake Bay food web. Shad feed on plankton and small fishes. In turn, they are preyed upon by larger fish, including bluefish, weakfish and striped bass. Historically, local economies flourished from the annual shad run in the spring, when the fishes' upriver migration begins. But shad populations were decimated in the 1970s by overfishing, pollution and dams and other blockages that prevent the fish from spawning in upstream habitats.

Status: The goal for American shad is based on an estimate of the spawning shad stock in major river systems, some with fish passage systems in place to bypass existing blockages by dams and other barriers. Based on the most recent data from the James, Potomac, Susquehanna and York rivers, the estimates of baywide shad abundance is 23 percent of goal achieved, which is an increase of almost 2 percent from 2007.

American Shad Abundance



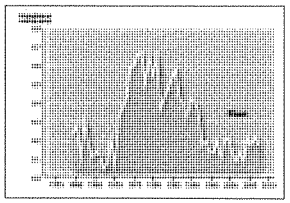
Data and methods: www.chesapeakebay.net/status_shad.aspx

MENHADEN

Importance: Menhaden play a key ecological role in the Chesapeake Bay because they are food for top predators such as striped bass and have a great ability to filter the water. The menhaden fishery is also one of the most productive on the Atlantic Coast, providing fish meal, fish oil and bait. Menhaden that inhabit the Chesapeake Bay are part of a coastal Atlantic stock, and while populations along the Atlantic Coast are healthy, some scientists are worried about low abundance in the Chesapeake.

Status: There is no goal for this indicator because there is no estimate of menhaden population in the Chesapeake Bay. At this time, it is not technically possible to set specific targets or goals. However, researchers track juvenile menhaden abundance by casting nets and recording the number of hauls where menhaden are present. Last year, the proportion of positive hauls was 18 percent, which was a 4 percent decrease from 2007.

Menhaden Abundance



Data and methods: www.chesapeakebay.net/status_menhaden.aspx

HEALTH OF FRESHWATER STREAMS AND RIVERS

Importance: Healthy freshwater streams and rivers have local and regional importance. Clean waterways are a benefit to residents who use them for recreation, drinking water, business and other purposes. The watershed's streams, creeks and rivers also eventually flow into the Chesapeake Bay, so their water quality has a direct impact on the health of the estuary.

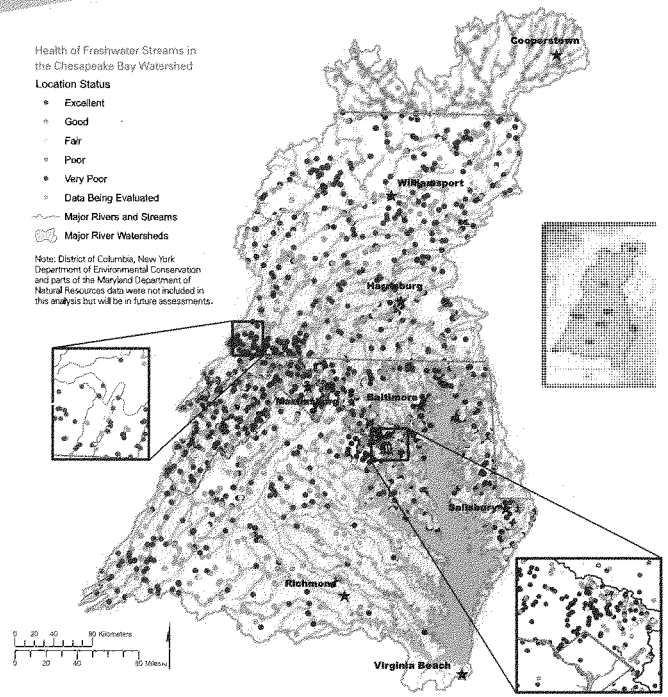
An effective way to measure the health of freshwater streams and rivers is to study the many tiny creatures that live in these waters. The abundance and diversity of snails, mussels, insects and other bottom-dwelling organisms – known as benthic macroinvertebrates – are good indicators of the health of streams. Because the communities of these creatures can't move very far and they respond in certain predictable ways to pollution and stresses in the environment, they provide valuable information about the health of the water.

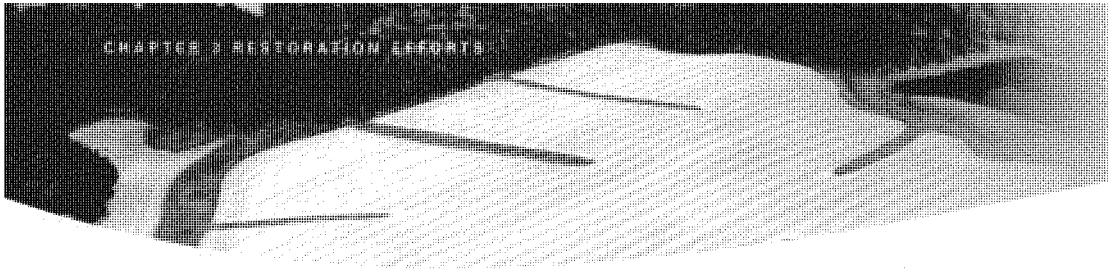
There are many different causes of polluted streams and rivers across the Chesapeake Bay watershed. Benthic macroinvertebrates are generally harmed by pollutants such as metals, acidity, sediment, pesticides, nitrogen and phosphorus. These pollutants come from sources such as mining, agriculture, urban and suburban runoff, automobile and power plant exhaust, and wastewater treatment facilities.

Status: The health of streams varies from very poor to excellent throughout the Bay watershed (see results on the map). Although sampling densities differ, some generalizations about the health of the watershed's streams can be made. For instance, streams tend to be in very poor to fair condition around large urban areas such as metropolitan Washington, D.C. (see map inset). Streams in heavily farmed or mined areas are also often in very poor to fair condition. In contrast, streams tend to be in good to excellent condition in forested areas with ample natural habitat and low levels of pollution, such as in the southwestern Pennsylvania region of the watershed (see map inset).

Overall, the analysis showed that out of 3,291 sampling sites in the watershed, 1,632 were in very poor or poor condition and 1,056 were in good or excellent condition. The results from this indicator will help managers and watershed groups focus their efforts to restore streams in need of improvement and protect the quality of the healthiest streams.

The watershed's streams, creeks and rivers eventually flow into the Bay, so their water quality has a direct impact on the estuary.


Health of Freshwater Streams in the Chesapeake Bay Watershed
Location Status
Excellent
Good
Fair
Poor
Very Poor
Data Being Evaluated
Major Rivers and Streams
Major River Watersheds
Note: District of Columbia, New York Department of Environmental Conservation and parts of the Maryland Department of Natural Resources data were not included in this analysis but will be in future assessments.
Cooperstown
Williamsport
Harrisburg
Baltimore
Salisbury
Richmond
Virginia Beach
0 20 40 80 Kilometers
0 20 40 80 Miles

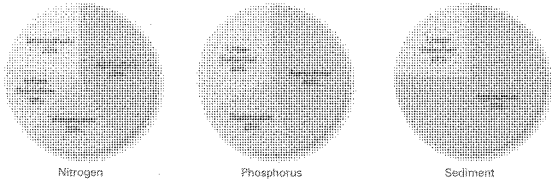


REDUCING POLLUTION

The Chesapeake Bay cannot be restored without water that is clean, clear and rich in oxygen. Currently the Bay and its rivers receive too much pollution for the ecosystem to remain healthy. The primary sources of pollution are agricultural land, wastewater treatment plants, urban and suburban runoff, and air pollution.

The Chesapeake Bay must meet a "pollution diet" to reduce pollution and restore the estuary. The indicators in this section show progress toward putting pollution reduction controls in place. The states in the Chesapeake Bay watershed and the District of Columbia have developed strategies for reducing pollution in their jurisdictions. Progress is measured by using data from monitoring and computer simulations.

Relative Responsibility for Pollution Loads to the Bay

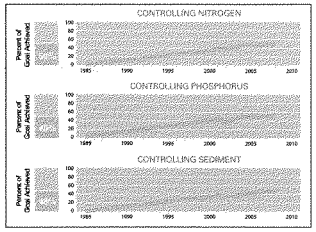


AGRICULTURE

Importance: About 25 percent of the land in the Chesapeake Bay watershed is dedicated to agriculture. While fertilizers, pesticides, manure and tilled soil are beneficial to crops, they become pollutants when water from irrigation and precipitation washes them into local waterways. Chesapeake Bay Program partners are working with farmers to help control pollution from the watershed's 8.5 million acres of farmland. Farmers are utilizing conservation practices such as nutrient management plans, cover crops, vegetative buffers, conservation tillage and animal manure and poultry litter controls.

Status: The partners have achieved 50 percent of the goal for agricultural nitrogen control efforts, a 2 percent increase from 2007. About 49 percent of the goal for agricultural phosphorus control efforts has been met, a 2 percent decline from the previous year. Partners have achieved 48 percent of the goal for sediment pollution control efforts, the same as 2007. These estimates do not account for all of the best management practices installed voluntarily by private landowners without the use of public funds.

Agricultural Pollution Controls



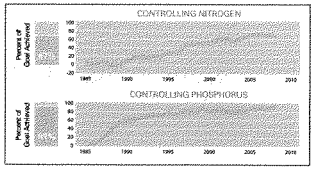
Data and methods: www.chesapeakebay.net/status_agriculture.aspx

WASTEWATER

Importance: There are 483 major wastewater treatment plants in the Chesapeake Bay watershed. Historically, the high amounts of nitrogen and phosphorus discharged by these facilities have degraded local waterways and the Bay. And as the population of the watershed continues to grow, so does the volume of water requiring treatment. Bay jurisdictions have reduced the pollution in wastewater through a new permitting process that requires plants to upgrade the processes and technology they use for treatment.

Status: The partnership has achieved 67 percent of the wastewater nitrogen reduction goal, which is a 2 percent decrease from 2007. Progress toward the wastewater phosphorus reduction goal stands at 91 percent, which is a 4 percent increase from the previous year. These decreases in the amount of nutrients discharged from wastewater treatment plants account for a large portion of the estimated nutrient reductions in the watershed to date.

Wastewater Pollution Controls



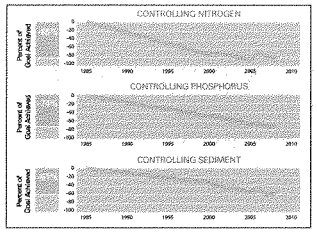
Data and methods: www.chesapeakebay.net/status_wastewater.aspx

URBAN/SUBURBAN LANDS AND SEPTIC SYSTEMS

Importance: When water from storms runs off roads, parking lots, rooftops and other hard surfaces, it carries pollution to local waterways and the Chesapeake Bay. Runoff from urban and suburban land is currently the only source of pollution that is increasing. This is due to continued population growth and related development. To address this problem, state and local governments are strengthening stormwater regulations and working to manage growth in a sustainable way. This includes an emphasis on using green infrastructure in the construction and retrofitting of buildings, including homes.

Status: Population growth and development are offsetting the Chesapeake Bay Program's efforts to reduce pollution from urban and suburban land and septic systems. The increases in population and construction have also surpassed the gains achieved from improved landscape design and stormwater practices. Additionally, it is still challenging to comprehensively account for on-the-ground control practices.

Urban/Suburban Pollution Controls



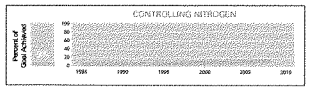
Data and methods: www.chesapeakebay.net/status_urbansuburban.aspx

AIR POLLUTION

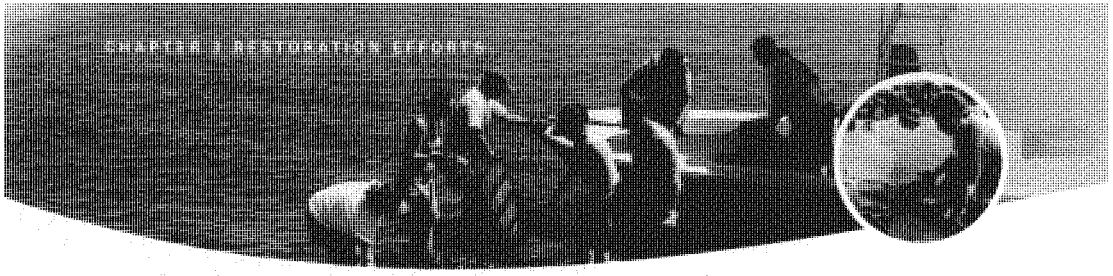
Importance: About one-third of the nitrogen that reaches the Chesapeake Bay comes from emissions into the air from automobiles, industries, power plants and similar sources. This pollution eventually falls onto water surfaces and land where it can be washed into waterways. About half of the air pollution comes from outside the Chesapeake Bay watershed, including places such as Ohio, South Carolina and Canada. The partnership is relying on federal and state laws that regulate emissions to significantly reduce airborne nitrogen.

Status: The Chesapeake Bay Program has met 9 percent of the goal for air pollution controls necessary to reduce nitrogen, which is a 1 percent increase from the previous year. While progress in this area is limited, it is expected to accelerate over the next several years as recently approved air pollution control measures take effect.

Air Pollution Controls



Data and methods: www.chesapeakebay.net/status_airpollution.aspx



RESTORING HABITATS

High-quality habitats are required for the overall balance of the Chesapeake Bay ecosystem and the health of fish, crabs, birds and other wildlife. Habitats provide the food, shelter and spawning areas needed for animals to survive. The restoration of habitats throughout the watershed is also beneficial for other reasons, from improving water quality to reducing erosion to increasing recreational opportunities.

Partners of the Chesapeake Bay Program have focused their habitat restoration efforts on four key areas. Planting of underwater grasses is critical because these areas are used by crabs, fish and waterfowl. Work to restore oyster reefs continues since they can provide habitat for communities of fish and bottom-dwelling organisms. Streams and rivers are being reopened to allow migratory fish to swim upstream to spawn and to increase habitat for local fish populations. While wetlands play many vital roles, they are especially valuable places for a diverse array of land and aquatic species.

Overall, the partnership is 55 percent of the way toward its goal for restoring habitats.

For more, visit www.chesapeakebay.net/habitatrestoration.aspx.

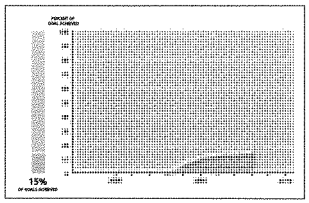
Habitats provide the food, shelter and spawning areas needed for animals to survive.

PLANTING BAY GRASSES

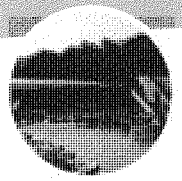
Importance: Underweter bay grasses depend on good water quality to grow and so that grass beds can naturally expand. For this reason, efforts to reduce pollution in the water can have a positive influence on restoring bay grasses. In addition to pollution reduction measures, there are a number of programs to collect seeds and plant bay grasses in the Bay and its tributaries. These plantings are located in areas without bay grasses but where water quality should support growth. These newly established grass beds then produce seeds, allowing for natural revegetation of adjacent areas.

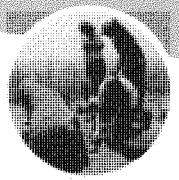
Status: In 2003, Chesapeake Bay Program partners set a goal to plant 1,000 acres by 2008. Last year, 8.5 acres of bay grasses were planted, bringing the total to 148 acres. This represents 15 percent of the goal and a 1 percent increase from 2007. Future plantings are dependent on available funding.

Planting Bay Grasses



Data and methods: www.chesapeakebay.net/status_baygrassesplanted.aspx



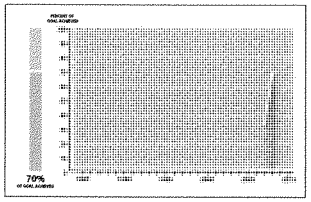


RESTORING OYSTER REEFS

Importance: Restoring oyster reefs throughout the Chesapeake Bay is a primary part of the strategy for increasing the native oyster population. To rebuild reefs, both oyster shells and alternate materials for oysters to grow on are planted in the Bay. Also, oysters are grown in hatcheries and than planted in natural and man-made habitats. Restoring reefs could increase the population of spawning adult oysters and, in turn, larval production. Many of these rebuilt reefs are designated as oyster sanctuaries and protected from harvest.

Status: The Chesapeake Bay Program has a goal of implementing restoration practices on 2,466 acres of oyster bar and reef habitat between 2007 and 2010. Last year, restoration efforts took place on 943 acres. This brings the total acreage to 1,719, or 70 percent of the goal. The success of these habitat restoration techniques has been limited by numerous factors, including disease, poor water quality, habitat degredation and fishing pressure. It should be noted that before this goal was set, a total of 15,648 acres were rehabilitated between 1994 and 2006.

Restoring Oyster Reefs



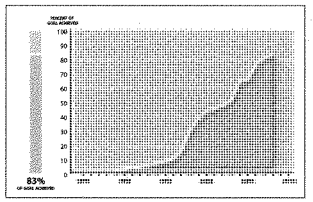
Data and methods: www.chesapeakebay.net/status_oysterrecovery.aspx

REOPENING FISH PASSAGE

Importance: Dams, culverts and other barriers currently block the movement of migratory fish to spawning grounds and reduce the habitat of local fish species in streams, creeks and rivers. Throughout the Chesapeake Bay watershed, these barriers are being removed or new lifts, ladders and passageways are being installed to allow the fish to swim upstream. Priority is given to fish passage restoration projects that open large stretches of habitat, remove dams, enhance the passage of migratory fish and remove impediments in streams that were previously impaired by acid mine drainage. Many of these projects also restore the flow of waterways and reduce the accumulation of sediment.

Status: The Chesapeake Bay Program's fish passage efforts are long-standing and generally successful. From 1988 through 2005, the partners opened 1,838 miles of fish passage, surpassing their original 1,357-mile restoration goal. In early 2005, Chesapeake Bay Program partners committed to increasing the restoration goal to 2,807 miles by 2014. Last year, 51 miles of fish passage were restored. This brings the total to 2,317 miles, or 83 percent of the goal, a 2 percent increase from 2007.

Reopening Fish Passage



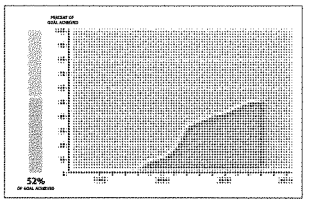
Data and methods: www.chesapeakebay.net/status_fishpassage.aspx

RESTORING WETLANDS

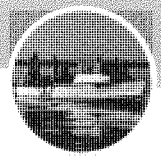
Importance: Because of the many benefits of wetlands – providing habitat, filtering water, preventing erosion – work is ongoing to increase the acreage of these areas. This involves establishing wetlands where they did not exist or reestablishing former wetlands to their natural state. Removing invasive species is also a way to rehabilitate that degraded wetlands. Additionally, these critical habitats are often protected through land purchases or conservation easements.

Status: Chesapeake Bay Program partners have a goal of restoring 25,000 acres of wetlands by 2010. Last year, 472 acres of wetlands were established or reestablished in Maryland, Pennsylvania, Virginia and the District of Columbia. The restored total stands at 13,005 acres, or 52 percent of the goal.

Restoring Wetlands



Data and methods: www.chesapeakebay.net/status_wetlandsrestored.aspx



MANAGING FISHERIES

Importance: The Chesapeake Bay fishing industry holds tremendous commercial, cultural and historical value. Managing the fisheries for blue crabs, oysters, striped bass, shad and menhaden is also critical to restoring and protecting the population of these species and their important place in the ecosystem. To improve fisheries management, the partners of the Chesapeake Bay Program are developing ecosystem-based plans. This type of comprehensive approach involves three components: actions that address a single species, a focus on multispecies interactions and consideration of the entire ecosystem. Improving water quality and restoring habitats are also part of this management approach.

Status: While significant effort went toward improving the management of Chesapeake Bay fisheries this year, very few of these efforts resulted in the implementation of ecosystem-based actions or the completion of new plans.

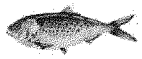
Overall, the partnership has achieved 51 percent of its goal for developing ecosystem-based management for fisheries.

For more, visit www.chesapeakebay.net/status_managingfisheries.aspx.

OYSTERS

Importance: Managing the oyster fishery requires a multi-pronged approach. Currently, there are minimum size limits, bushel limits, gear restrictions and seasonal and geographical closings. Additionally, sanctuaries are used to protect oysters from harvest and increase the population of spawning adult oysters. Restoration efforts that focus on rebuilding reefs and planting oysters also benefit the fishery. It continues to be challenging to identify the level of harvest that supports the fishery but does not compromise restoration efforts.

Status: The score for oyster fishery management increased by 2 percent, from 37 to 39 percent, because of three actions taken during 2008. First, a Programmatic Environmental Impact Statement that evaluates alternatives for restoring the oyster population was released for public comment. Second, Maryland completed the first year of a pilot study on how best to measure the oyster biomass, which will improve population assessment and management. Finally, development of oyster aquaculture is progressing, which could reduce harvest pressure on wild oysters and provide a viable product for the industry.



ATLANTIC MENHADEN

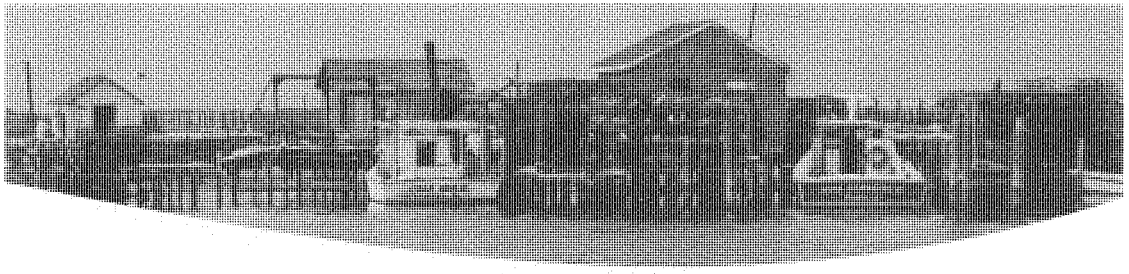
Importance: Atlantic menhaden have a unique role in the ecosystem as filter feeders and prey for top predators such as striped bass, which requires a multi-species management plan. Menhaden migrate into Chesapeake Bay and are part of a larger stock along the Atlantic Coast. The coastal population is healthy, but there are concerns about declining numbers of young menhaden in the Bay. In response, a five-year cap on commercial harvest within the Bay was put in place in 2006. During this time, a variety of projects will occur.

Status: The score for Atlantic menhaden fishery management did not change. Some research projects were completed but did not lead to any changes to management; other projects are still underway. Additional research is needed, including linking changes in the environment to recruitment and growth, using remote sensing technology to determine menhaden distribution and abundance, understanding larval movement into the Bay from the mid-Atlantic spawning areas, and determining the level of removal of menhaden by predators such as striped bass. A menhaden team was organized to begin developing an ecosystem-based fishery management plan and background briefs will be ready by March 2009.

AMERICAN SHAD

Importance: Overfishing, water pollution and dams that prevented access to spawning areas led to a greatly diminished stock of American shad in the 1970s. This led two states to implement a fishing moratorium: Maryland in 1980 and Virginia in 1994. In addition to the shad fishing moratorium, researchers and managers are currently stocking hatchery-raised fish, removing dams and installing fish passage on key Bay tributaries to restore this species. Catch limits and safe levels of harvest must be developed before the Bay fishery can be reopened. Also, because shad spend much of their lives in coastal Atlantic waters, continued management by the Atlantic States Marine Fisheries Commission is crucial.

Status: The score for American shad fishery management has not changed. However, new coastal management measures are under development. In response to the 2007 coastal stock assessment, the Atlantic States Marine Fisheries Commission is developing biological reference points for managing the stocks, developing stock restoration goals, decreasing and restricting fisheries, and planning to develop new management strategies in 2009.



STRIPED BASS

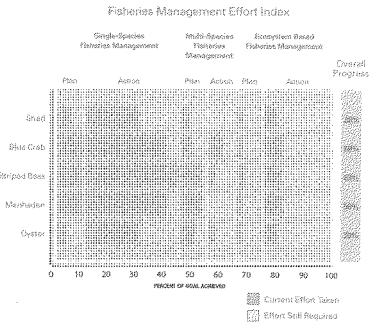
Importance: The Chesapeake Bay is the primary spawning and nursery habitat for up to 90 percent of the Atlantic Coast's striped bass population. The Bay's fishery for striped bass collapsed during the 1970s and 1980s as the population of this species plummeted. But fishing moratoriums and management led to a rebound and the moratorium was lifted in 1990. Fishery management currently involves monitoring, catch quotas and seasonal closings. Ecosystem-based fisheries management is especially important for striped bass because they are among the Bay's top predators, feeding on Atlantic menhaden. An annual cap on the commercial harvest of menhaden is in place from 2006 to 2010.

Status: The score for striped bass fishery management did not change. While some important research occurred last year, it has not yet been included into an ecosystem-based fishery management plan. During 2008, biological briefs and background information for such plans were completed. Research continued on the disease mycobacteriosis. Modeling results provided the first evidence of mycobacteriosis-associated mortality in the striped bass population in the Bay. Scientists also identified priority areas for protection and restoration based on the location of striped bass spawning and larval distribution and water quality conditions.

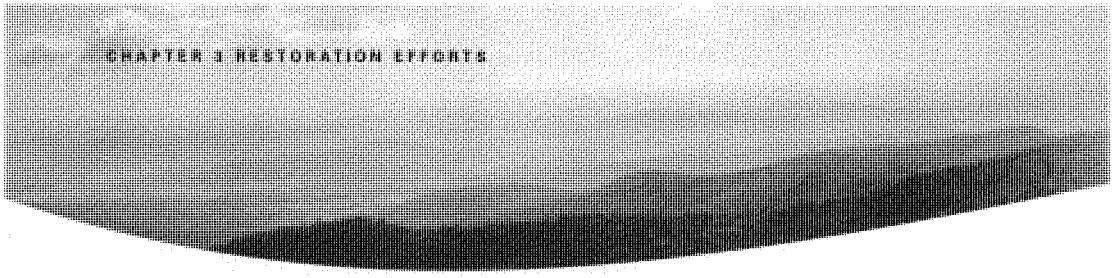
BLUE CRABS

Importance: Blue crabs make up the most valuable commercial fishery in the Chesapeake Bay. To both protect the fishery and restore the spawning stock, the harvest is regulated through a minimum catch size, gear restrictions and seasonal harvest limits. An annual winter dredge survey provides estimates of the percentage of the crab population that is removed by harvest. Additionally, because blue crabs play important roles as both predator and prey, scientists have studied their interactions with striped bass, their predators.

Status: The score for blue crab fishery management increased by 2 percent, from 56 to 58 percent, because of several actions during 2008. Commercial harvest regulations were developed by Maryland and Virginia to reduce the harvest of mature female blue crabs by 34 percent. New Maryland regulations include an early seasonal closure, increased size limits for peeler crabs and commercial catch limits. The recreational fishery was prohibited from harvesting any female crabs. New Virginia regulations include an extended closure of the sanctuary, elimination of the winter dredge fishery, increased size limits for peeler crabs and a gear reduction plan. Also, the commercial blue crab fishery was declared a state of disaster by the U.S. Department of Commerce. Each state will receive $10 million over the next three years for watermen projects such as habitat restoration, fishery monitoring, industry diversification and aquaculture.



Data and methods: www.chesapeakebay.net/status_fisheriesmanagement.aspx



PROTECTING WATERSHEDS

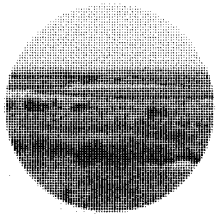
A watershed is an area of land that drains to a particular river, lake, bay or other body of water. Within the Chesapeake Bay watershed, there are tens of thousands of smaller watersheds that drain into local waterways, which all eventually flow into the Bay. Protecting the region's watersheds is critical because what happens on land has a direct impact on the water. This effort is also important because the human population in the Chesapeake Bay watershed is increasing, bringing construction and suburban sprawl. This growth and development reduce natural areas such as forests and wetlands.

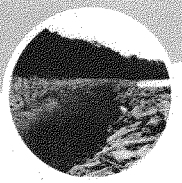
To protect watersheds, Chesapeake Bay Program partners continue to plant buffers of trees, bushes and other vegetation along waterways. Efforts also involve permanently preserving land from development throughout the watershed and preventing sprawl through the use of statewide smart growth programs. Management plans are development to guide the protection and restoration of nature in watersheds of all sizes.

Overall, the partnership is 74 percent of the way toward its goals for protecting watersheds.

For more, visit www.chesapeakebay.net/status_protectingwatersheds.aspx.

A watershed is an area of land that drains to a particular river, lake, bay or other body of water.



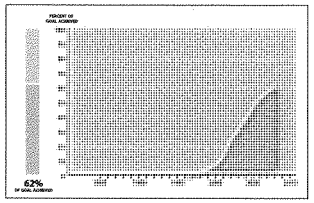


RESTORING FOREST BUFFERS

Importance: Trees, bushes and other plants that line the banks of waterways are called forest buffers. This vegetation provides habitat for wildlife, stabilizes stream banks from erosion and keeps river waters cool, an important factor for many fish. Well-maintained forest buffers also naturally absorb pollution, helping to improve water quality in neighboring streams and rivers as well as downstream. Work is ongoing to plant buffers along thousands of miles of streams, creeks and rivers in the Chesapeake Bay watershed.

Status: Chesapeake Bay Program partners achieved their original 2010 buffer restoration goal of 2,010 miles well ahead of schedule and in 2003 set a new goal to conserve and restore forests along at least 70 percent of all streams and shoreline in the watershed, with a near-term goal of at least 10,000 miles by 2010. From September 2007 to August 2008, about 449 miles of forest buffer was planted for a total of 6,172 miles. This is 62 percent of the goal, a 5 percent increase from last year.

Restoring Forest Buffers



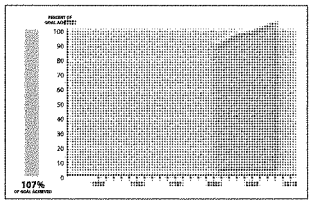
Data and methods: www.chesapeakebay.net/status_forestbuffers.aspx

PRESERVING LANDS

Importance: Land in the watershed is a finite and fragile resource, and what happens on land has an enormous impact on local waterways. Population growth and construction have increased the need to preserve natural places such as forests. Parks, wildlife refuges and other preserved lands provide habitat for animals and filter pollution before it reaches the Bay and its tributaries. Chesapeake Bay Program partners have pursued land preservation by buying property, accepting donations, arranging for easements and purchasing development rights.

Status: Maryland, Pennsylvania, Virginia and the District of Columbia have a commitment to permanently protect from development 20 percent of their combined 34 million acres by 2010. Last year, 115,613 acres were preserved. This brings the total land protected to 7.32 million acres, which surpasses the goal two years before the deadline. Preservation efforts will continue because in December 2007 the Bay states committed to permanently conserve an additional 695,000 acres of forested land throughout the watershed by 2020.

Preserving Lands



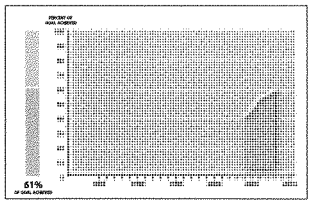
Data and methods: www.chesapeakebay.net/status_landspreserved.aspx

DEVELOPING WATERSHED MANAGEMENT PLANS

Importance: Protecting watersheds is a complicated and challenging task. To successfully protect and restore stream corridors, forest buffers, wetlands, parks and other natural spaces, watershed management plans are needed. These strategic guides preserve not only watershed health, but also the quality of life in communities. For management plans to be acceptable, they must address conservation of natural areas, aim to improve habitat and water quality, have the necessary tools and resources, and garner local support.

Status: The Chesapeake Bay Program has a goal of developing and implementing watershed management plans for two-thirds of the 34 million acres in Maryland, Pennsylvania, Virginia and the District of Columbia. Last year, watershed plans were added for 827,204 acres in these jurisdictions, bringing the total to 13.9 million acres. This represents 61 percent of the goal, which is a 4 percent increase from 2007.

Developing Watershed Management Plans



Data and methods: www.chesapeakebay.net/status_watershedmanagement.aspx

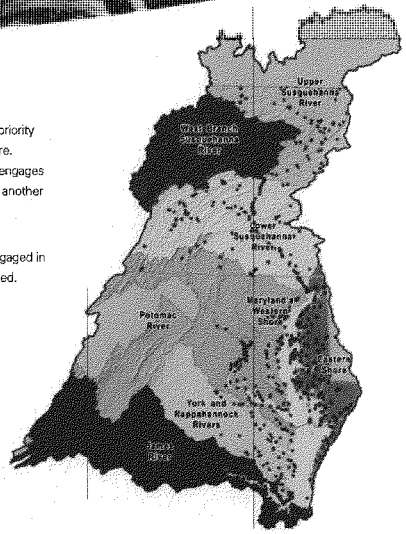
FOSTERING STEWARDSHIP

For the Chesapeake Bay to be restored and protected, the region's citizens, communities and other stakeholders must be actively involved. Fostering stewardship of the Bay and its watershed is a top priority for Chesapeake Bay Program partners. Public access is vital to building personal connections to nature. There are also various communication and outreach programs underway to provide information that engages people in the restoration effort. Environmental education opportunities for students and teachers are another area of emphasis. The ultimate measure of stewardship, however, is citizen and community action.

The indicators in this section reflect steady progress in providing public access and enhancing environmental education. But programs to increase the number of communities and businesses engaged in restoration have stalled. At the same time, a new project to measure citizen action has been launched.

Overall, the partnership is 65 percent of the way to its goal for fostering stewardship.

For more, visit www.chesapeakebay.net/stewardshipanded.aspx.



● Public Access Location

COMMUNICATIONS AND OUTREACH

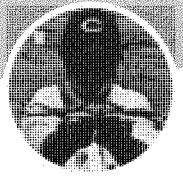
Sharing the most current information about the health of the Chesapeake Bay and restoration work is an important part of fostering stewardship. Partners of the Chesapeake Bay Program believe that knowledge empowers citizens and enables them to help protect nature. There are many ways the Chesapeake Bay Program communicates with the public, including its website, email updates and a new blog. Outreach efforts are also ongoing and involve giving public presentations, participating in environmental events and conferences, and distributing news releases and publications. Members of the public are encouraged to sign up to receive regular updates and to visit the websites often for the latest news.

Bay News: This daily email provides links to media coverage from around the watershed. To sign up, visit www.chesapeakebay.net/thebayinthenews.aspx.

Chesapeake Currents: This monthly e-newsletter contains the Bay Program's news on health and restoration. To sign up, visit www.chesapeakebay.net/enewsletter.aspx.

Bay Blog: This new blog features the firsthand perspectives of Bay Program staff. Visit blog.chesapeakebay.net.

Bay Journal: This free monthly newspaper reaches more than 50,000 subscribers. Visit www.bayjournal.com.



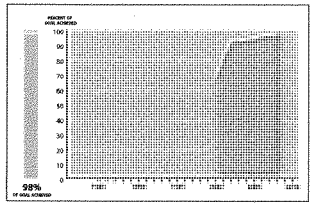
PUBLIC ACCESS

Importance: For people to deeply value the Chesapeake Bay and the thousands of streams, creeks and rivers that flow into it, they need access to nature throughout the watershed. This allows people to enjoy activities such as fishing, swimming, kayaking, hiking and picnicking, which creates a personal connection with nature and builds public support for restoration efforts. Program partners continue to increase and improve access in an environmentally sensitive manner through the Chesapeake Bay Gateways Network, water trails and the Captain John Smith Chesapeake National Historic Trail.

For more information and a map of public access locations, visit www.chesapeakebay.net/publicaccess.aspx.

Status: There are multiple goals within the larger public access goal. These include expanding by 30 percent the system of public access points to the Bay, its tributaries and related sites; developing partnerships with at least 30 sites to enhance interpretation of Bay-related resources and stimulate volunteering; and increasing designated water trails in the Bay region by 500 miles. Last year, 11 public access sites were acquired, developed or enhanced, bringing the total to 754. Six new Gateways sites were added, raising the total to 161. About 23 miles of water trails were developed, for a total of 2,184 miles. With these additions, the partnership has reached 98 percent of its public access goal.

Public Access



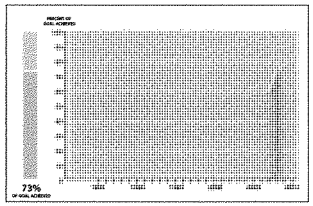
Data and methods: www.chesapeakebay.net/status_publicaccess.aspx

EDUCATION AND INTERPRETATION

Importance: Perhaps the best way to foster stewardship of the Chesapeake Bay is through education, especially for the millions of children who live in the watershed. The long-term health of the environment will depend on their interest and ability to protect nature. Chesapeake Bay Program partners continue to promote environmental education in classrooms at elementary, middle and high schools, with a focus on providing a Meaningful Watershed Educational Experience (MWEE) for all students before they graduate. Partners also provide lifelong learning opportunities for citizens of all ages, with information and interpretation at a multitude of locations in the region.

Status: In 2000, the partnership set a goal to provide a MWEE for every student in the watershed before graduation from high school. In 2008, the partnership increased the number of experiences provided for student to three, which will mean a MWEE in elementary, middle and high school. About 73 percent of the goal was achieved during the 2007-2008 school year. Also, since 2002 the NOAA Bay Watershed Education and Training Program (B-WET) grant program has funded MWEEs for more than 150,000 students and training opportunities for more than 15,000 teachers.

Education and Interpretation



Data and methods: www.chesapeakebay.net/status_education.aspx

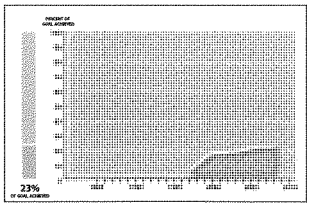
CITIZEN AND COMMUNITY ACTION

Importance: The Chesapeake Bay and its watershed will never be restored and protected without the action of its 17 million residents and the involvement of local government. That many people can surely have a tremendous impact if they are actively involved in the cleanup. A top priority for the Chesapeake Bay Program is encouraging the public to participate in activities that are positive for nature, including at home, at work and in the community. It is also important for towns and cities to put measures in place that create clean water.

Status: For community action, the partnership has a goal of establishing 330 local governments, or 20 percent of those in the watershed, as Bay Partner Communities. These are towns and cities that are implementing Bay-friendly measures. To date, 77 local governments have been awarded Bay Partner Community status, which is 23 percent of the goal. However, the program is no longer funded.

To measure citizen action, the first Chesapeake Volunteer Count was launched. This effort asked watershed organizations to report the number of volunteers for the year. Based on preliminary data collected from 73 Chesapeake Bay watershed organizations, 50,590 volunteers participated in restoration activities in 2008. The majority of the organizations reported that volunteerism rates remained the same or increased from 2007.

Citizen and Community Action



Data and methods: www.chesapeakebay.net/status_citizenaction.aspx

RESTORATION HIGHLIGHTS

At the 2007 Chesapeake Executive Council meeting, members selected topics critical to restoration to be their "champion roles." Chesapeake Bay Program partners have since made significant progress on issues such as promotion of low-impact development, support of agricultural conservation practices and improvement of wastewater treatment. The partnership will continue to take this type of targeted action on vital issues in 2009.

ACCOUNTABILITY – MARYLAND

Through the BayStat program, Maryland has secured and will award annual funding to address non-point-source pollution; appointed a scientific advisory panel; strengthened its Critical Area Program, including provisions to significantly change how coastal shorelines are stabilized; doubled annual cover crop enrollment to 400,000 acres; and targeted Program Open Space for priority conservation areas.

AGRICULTURE CONSERVATION PRACTICES – VIRGINIA

Virginia has allocated $20 million for agricultural best management practices in the commonwealth, the largest amount ever appropriated in the history of Virginia's agricultural best management practice cost-share program.

BLUE PLAINS – CHESAPEAKE BAY COMMISSION

The Chesapeake Bay Commission met with members of Congress to advocate for more federal support to upgrade the Blue Plains wastewater facility and helped arrange congressional tours and briefings on Blue Plains. These efforts resulted in congressional hearings in May, and the House and Senate appropriated $14 million and $16 million, respectively, for combined sewer overflow (CSO) upgrades.

BLUE CRAB RESTORATION – MARYLAND, VIRGINIA

To rebuild the blue crab population, Maryland and Virginia agreed to implement new bistate regulations to reduce the harvest of female crabs in the Chesapeake Bay by at least 34 percent. The two states have agreed to keep crab exploitation at a target level of 46 percent to provide a buffer against overfishing in the future.

BIOFUELS – PENNSYLVANIA, CHESAPEAKE BAY COMMISSION

Together, Pennsylvania and the Chesapeake Bay Commission convened a 22-member Biofuels Advisory Panel that met throughout the year, culminating with the release of the Next-Generation Biofuels report at the Chesapeake Bay Biofuels Summit in Harrisburg, Pennsylvania, in September. Each state has developed a State Action Plan.

CARBON SEQUESTRATION – DELAWARE

Delaware hosted a symposium entitled "Carbon Sequestration on Farm and Forest Lands: How to Make Trading/Offset Programs Work in the Chesapeake Bay Region." The symposium educated agency staff about carbon sequestration opportunities, identified necessary elements of offset and trading programs, and analyzed the water quality benefits of agriculturally based carbon offset projects.

CHESAPEAKE ACTION PLAN – EPA AND PARTNERS

The Chesapeake Action Plan (CAP), described in a report to Congress submitted by the EPA on behalf of the Chesapeake Bay Program in July, will strengthen and expand partnerships in the watershed, enhance coordination of restoration activities and improve accountability and transparency in protecting the Bay. The tools contained in the CAP – the strategic framework, dashboards, detailed activity database and adaptive management system – will help the Chesapeake Bay Program become more efficient, strategic, effective and accountable in meeting its goals.

CONOWINGO DAM/RESERVOIR – PENNSYLVANIA

To better understand the movement of sediments trapped behind Conowingo Dam on the Susquehanna River, Pennsylvania and the U.S. Geological Survey are conducting studies of the rate of sediment accumulation. The results will be available in 2009.

ENGAGING LOCAL GOVERNMENTS – MARYLAND

Through local implementation grants that are part of the Chesapeake and Atlantic Coastal Bays 2010 Trust Fund, Maryland has provided restoration funding directly to local communities in the state. To support local implementation, Maryland developed a new service to connect local governments with resources that help them accomplish their restoration goals.

ENGAGING LOCAL GOVERNMENTS ON STORMWATER – WEST VIRGINIA

To learn how to develop communication tools to engage local communities, two staff members and three stakeholders from West Virginia participated in a local government training session in July. West Virginia also organized a half-day stormwater workshop that was attended by 61 local stakeholders, planners and engineers.

GREEN INFRASTRUCTURE – DISTRICT OF COLUMBIA

To help manage growth and reduce polluted runoff, the District of Columbia implemented one of the strongest, most innovative stormwater permits in the nation, launched the RiverSmart Homes program to better manage stormwater in residential areas, developed an aggressive Anacostia Restoration Plan, and spent more than $1 million on low-impact development (LID) projects, such as green roofs.

FARM BILL – CHESAPEAKE BAY COMMISSION

With the passage of the 2008 Farm Bill, the Chesapeake Bay watershed was singled out to receive an additional $188 million for conservation programs, more than double the current funding level. Additionally, there is a potential $250 million for the Chesapeake watershed through national programs in which Bay region farmers already participate.

FOREST CONSERVATION – U.S. FOREST SERVICE

Most partners that signed the 2007 Forestry Conservation Initiative are on track to meet their 2012 forest protection goals. The Forest Service hosted a Forest Conservation Summit in May, bringing together Bay watershed foresters, land trusts and local governments for the first time. Progress is being made to develop ecosystem markets such as the Bay Bank and establish a revolving loan fund for forestland owners who do not want to sell to developers.

LOW-IMPACT DEVELOPMENT – U.S. NAVY

To help reduce polluted runoff to the Chesapeake Bay and its rivers, the U.S. Navy is evaluating the most effective low-impact development techniques to incorporate into all large development and redevelopment projects at Navy bases in the Chesapeake Bay watershed. U.S. Navy personnel are also fostering awareness about low-impact development on Navy bases.

INNOVATIVE TECHNOLOGY FUND – MARYLAND, U.S. ENVIRONMENTAL PROTECTION AGENCY

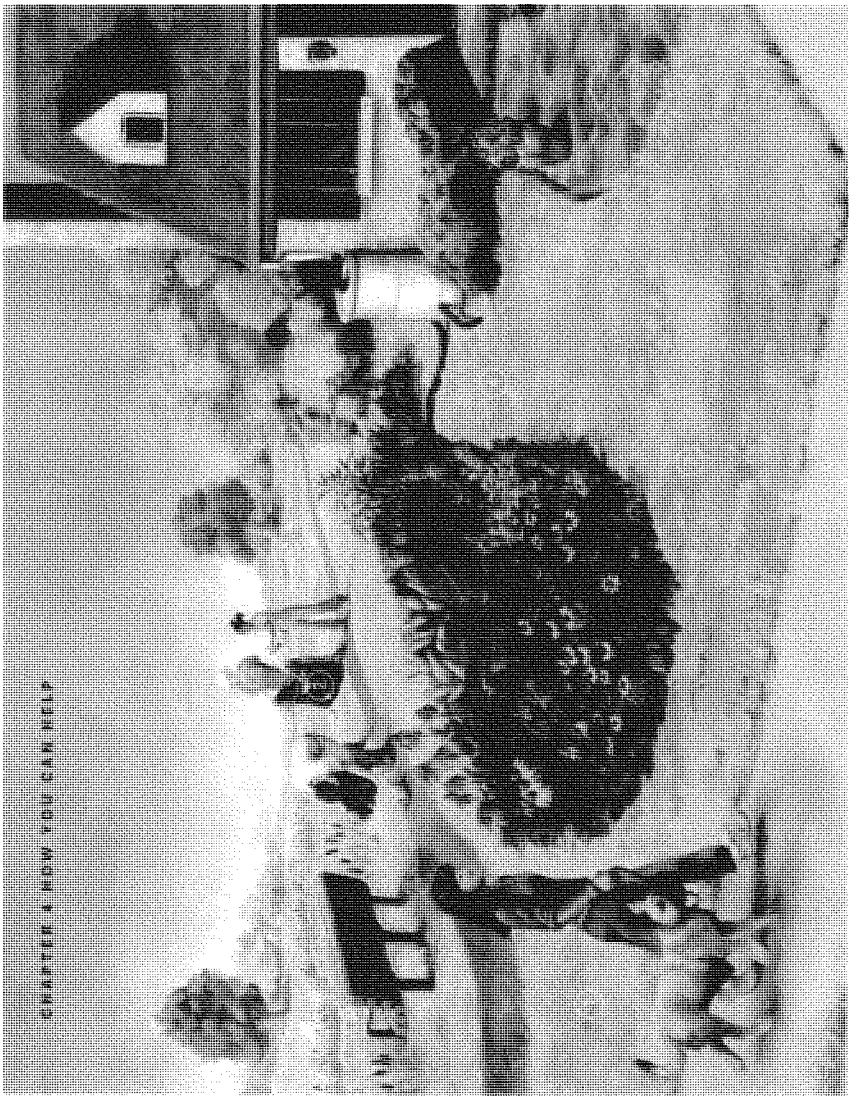
The state of Maryland and the EPA have partnered with the University of Maryland to develop an innovative program that promotes investment in new research and technologies that address water quality problems and accelerate Bay restoration. The EPA has provided funding to the university's Maryland Industrial Partnerships Program, and the state has partnered with MTECH Ventures to create a seed capital fund.

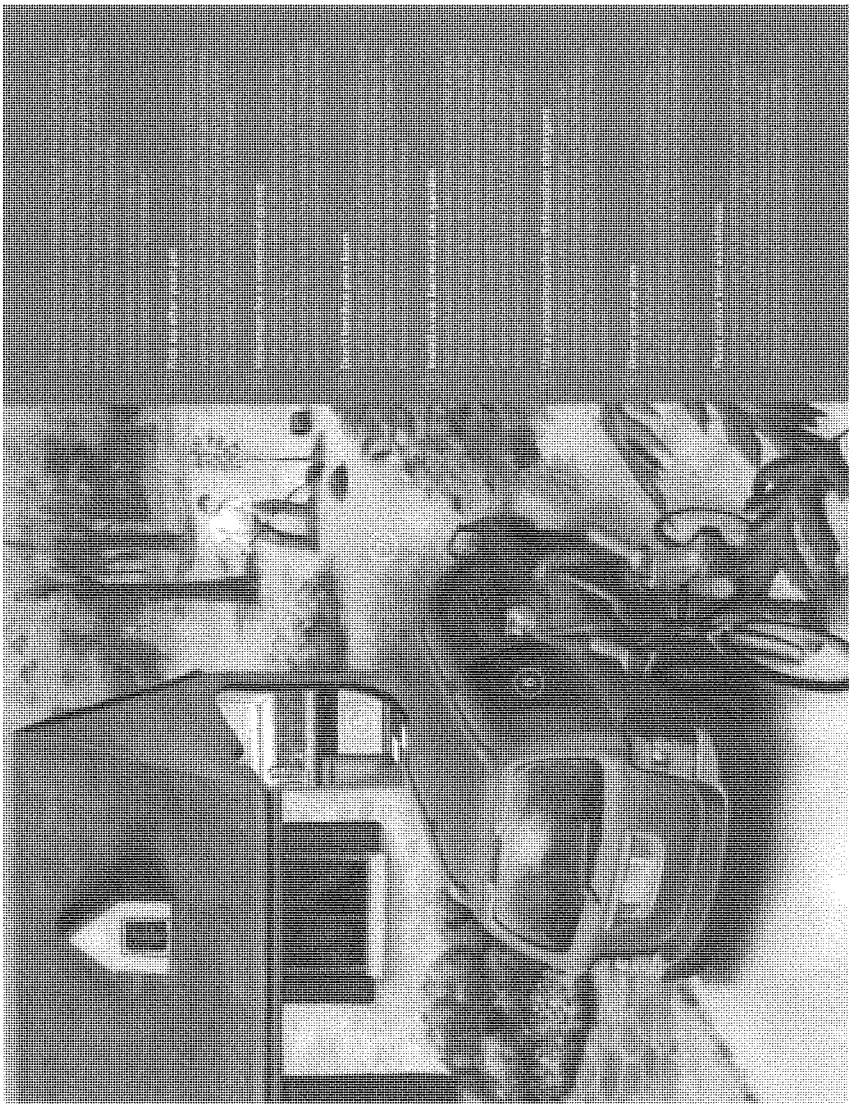
RESTORATION FUNDING – U.S. ENVIRONMENTAL PROTECTION AGENCY

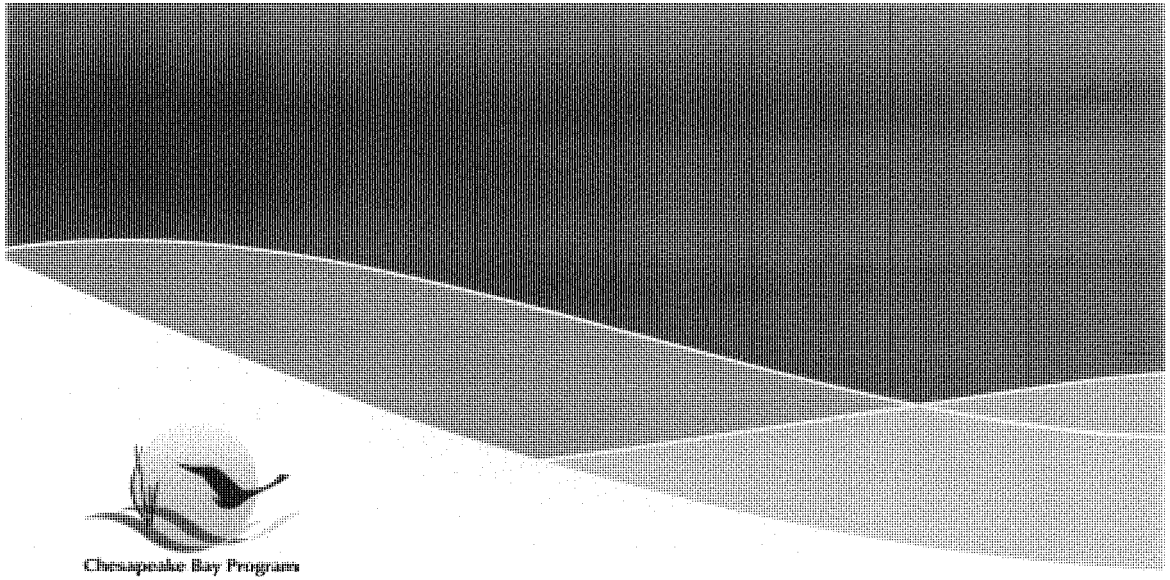
The National Fish and Wildlife Foundation (NFWF) issued a request for pre-proposals for large-scale restoration projects that use innovative, sustainable and cost-effective approaches to accelerate the reduction of nutrients and sediments in targeted Chesapeake Bay sub-watersheds. Funding for these projects comes from the EPA Chesapeake Bay Program Office.

WETLANDS RESTORATION – NEW YORK

To expand a successful wetlands restoration program in New York, the Upper Susquehanna Coalition established a 501(c)(3) wetland trust to supplement grants and leverage funds, restored 175 acres of non-tidal wetlands designed to maximize ecosystem functionality, and conducted hands-on training on successful wetland design criteria.


CHAPTER 6 HOW YOU CAN HELP





Chesapeake Bay Program
A Watershed Partnership

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Many federal and state agencies, academic institutions, and non-governmental organizations contributed data and analysis to this report, including the Alliance for the Chesapeake Bay, Anne Arundel Community College, Chesapeake Bay Commission, Chesapeake Research Consortium, Delaware Department of Natural Resources and Environmental Control, District of Columbia Department of the Environment, District of Columbia Department of Health, Fairfax County (Virginia), Interstate Commission on the Potomac River Basin, Maryland Department of Agriculture, Maryland State Department of Education, Maryland Department of the Environment, Maryland Department of Natural Resources, Montgomery County (Maryland), Morgan State University Estuarine Research Laboratory, National Aquarium in Baltimore, National Park Service, National Oceanic and Atmospheric Administration, New York State Department of Environmental Conservation, Old Dominion University, Oyster Recovery Partnership, Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Department of Education, Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, Prince Georges County (Maryland), Susquehanna River Basin Commission, University of Maryland Center for Environmental Science, University of Maryland College Park, Upper Susquehanna Coalition, U.S. Army Corps of Engineers, USDA Natural Resource Conservation Service, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Versar, Inc., Virginia Department of Environmental Quality, Virginia Department of Conservation and Recreation, Virginia Department of Education, Virginia Department of Forestry, Virginia Department of Game and Inland Fisheries, Virginia Institute of Marine Science, Virginia Marine Resources Commission, Virginia Polytechnic Institute and State University, West Virginia Department of Agriculture, and West Virginia Department of Environmental Protection.

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Senator CARDIN. I wanted you to go through this because, again, I agree with Mr. Hutchison's point, that it has to be equal to the efforts being made by other sources of bay nutrients. I will broaden that. I think if we look at the bay in its totality, we need a strategy that is going to be fair to all of the segments. Some are easier to get to because of perhaps the regulatory system or the source, but we need to have a fair program to all the activities that are dealing with the pollutants, obviously go to those that are the most economical to deal with, but we need a comprehensive approach.

Mr. Baker, let me just turn to you for a moment. So what type of regulatory system should we have? What do we need to do? Do we need a fundamental change? Senator Mathias you mentioned earlier, who is one of my heroes when it comes to not just the Chesapeake Bay, but is a great role model for all of us who serve in the U.S. Senate. 1982 it was that he made his recommendation. It was a different political climate in 1982 than it is today. Should we be looking at Senator Mathias' recommendation, or can you bring us up to date as to how you think we need to deal with the current challenges?

Mr. BAKER. Thank you, Senator. By definition, the boundary of State government ends at the State line. And so a management regime that relies on individual Governors to set strategies that will have a cumulative benefit of restoring a system that spans six States and the District of Columbia is bound to be handicapped from the get-go.

The development or the putting in place of a whole new governmental entity, a title 2 river basin commission, is probably as unlikely today as it was in 1982 from a political standpoint. But the jurisdiction that does have not only we say, we believe, the authority but the responsibility watershed-wide is the Federal Government, specifically the Environmental Protection Agency. Let me just give you one example.

The northern section of Maryland's part of the Chesapeake Bay is really dominated by what comes out of Pennsylvania and New York State. Maryland has no authority and certainly no responsibility to address pollution coming out of Pennsylvania and New York State. The States of Pennsylvania and New York have interest in clean water in their jurisdictions, but anybody would be fooling themselves if they said that their primary interest is improving the waters of Maryland.

So you need a Federal Government to set a specific and enforce a standard for the entire watershed. We think that the science has absolutely been precise in terms of where the pollution is coming from and what reductions need to be made on a tributary-by-tributary basis. The need is for EPA to enforce that science, and certainly what we have heard from Ms. Jackson says she will. We are looking forward to seeing that that happens, and as you know, we have a lawsuit against EPA to try to see that a Federal court will require EPA to enforce those provisions of the Clean Water Act.

Senator CARDIN. I guess my point is this. There is a new administration in town. They certainly have a different priority as it relates to the environment. And I guess my question to you—and maybe if you do not feel comfortable in answering it, you can certainly supplement this at a later point. But do we have an ade-

quate regulatory framework in place? We just need to enforce it. And should we be giving this administration an opportunity to act? Or do we need Congress acting to strengthen the regulatory and monitoring and enforcement provisions so that you can get the results? And I think your observations here to be very important to us.

Mr. BAKER. I understand the question precisely. There is ample authority and responsibility under the Clean Water Act to not wait, to begin reducing pollution immediately from all of the areas that are clearly stated in the Clean Water Act, certainly all point sources, stormwater from urban and suburban areas, and certain agricultural sources.

Now, do we need in this Country greater guidance, greater clarity, perhaps some expanded responsibilities if section 117 of the Clean Water Act were reauthorized? Absolutely, absolutely. But there is no need to wait any longer to start putting things in place under existing authority, and we have a lot of ground to make up. We really have seen very little, if any, of that in the last decade.

Senator CARDIN. Another area I would ask for your advice, and that is the transparency at EPA. Again, we have a new administration. I think they are trying to make sure that there is accountability for good policy and the use of good science. I think it is an opportunity perhaps for us to institutionalize a better public transparency on how decisions are made, and we would welcome your thoughts as to whether we should try to put that into legislation or just get it through administrative action.

Mr. BAKER. I think you use all tools at your disposal. And when you asked Mr. Fox the question after his testimony, the one word I wrote down was transparency. I think that is critical, and I think EPA and the rest of the Federal agencies have an absolute obligation for full and complete transparency with the public. That has not been the case at all times in the past. The public and really decisionmakers at the State and local level are often whipsawed by different information that comes out, and that simply does not need to be the case. And I think EPA can play a big role in that.

Mr. CONNOLLY. Mr. Chairman.

Senator CARDIN. Certainly.

Mr. CONNOLLY. Could I go back, if you would not mind, just to the issue of governance and the concept that Mr. Baker cited from our friend, Senator Mathias, whom I had the privilege of working with for most of a decade on the Senate side?

We do have some models that require regional cooperation and regional planning that wash the hands of States—or maybe to put it positively, cross-jurisdictional responsibilities. For example, we have a structure in transportation with metropolitan planning organizations. In metropolitan Washington, it is TPB. It is the Transportation Planning Board, which has a lot of power in deciding which projects get approved in Maryland, D.C., and Virginia and which do not, what is in the constrained long-range funding plan and what is not. And so we do have that model.

With respect to air quality, we have MWAQC, the Metropolitan Washington Air Quality Committee, that actually has a lot of power in requiring respective jurisdictions ultimately, if they do not volunteer to do it, to take mitigation measures that are very spe-

cific. We have even looked at things like odd/even days for lawn mowing to make sure that metropolitan Washington is in compliance with EPA air quality standards.

So it seems to me that we could look at some of those models with respect to the bay because I think Mr. Baker's point is well taken. The fervor with which Maryland and Virginia have entered into mitigation measures and the investments that we have made most certainly have not been matched by some of our neighboring States.

Senator CARDIN. Well, I want to agree with both of you. I want to agree with Mr. Baker in that I do think EPA has a great deal of authority, and they can act. We want to see them act in order to protect the environment. That is what EPA's mission is. We want them to be certainly within the legal authority that they have, but using that to accomplish their goals. And where they run into difficulty because of legal uncertainty, please come to us and see whether we can help you clarify that and work with you.

But on the other side, I am concerned about consistency here and would like to make sure that we have in statute the clear direction necessary to reach our objectives in regards to the Chesapeake Bay. So even if you have the authority that you need, I would be concerned that if we are not more specific in statute, we could fall back to a time where it may not be as high a priority as it is with this current administration. So I think we would want some guidance in either of those circumstances.

Mr. Baker, I want to ask you one of my favorite questions concerning the Asian oyster. I know that the decision was made not to move forward on it, but that could be changed tomorrow or the next day. Does Congress need to act on this issue?

Mr. BAKER. I had not even thought of that. The decision that came out of the Corps of Engineers now stands. We think they made the right decision. Certainly when so little has been done to really give the Chesapeake Bay oyster the chance it deserves, to bring in a foreign species with all the consequences that are unknown, would be right in the face of good science. So any help Congress could give would be welcome, and we would be happy to work with you on it.

Senator CARDIN. Well, we may take you up on that. It would be good to have clear direction in statute on these types of issues. On the other hand, we do want good science to be able to move forward. But I share your concern. Senator Mikulski has been one of the leaders in the U.S. Senate on trying to make sure that we have good science as it relates to oysters in Maryland. Of course, there have been many projects moving forward.

You seem to be more optimistic than perhaps I have heard in the past on the oyster. Is there a reason for that?

Mr. BAKER. Well, yes, two things. First, there is some sign that it looks as if our native bay oyster may—and I really underscore "may"—be developing some resistance to the two parasites.

And second, just look at the marketplace. There are a number of companies now growing and marketing native Chesapeake Bay oysters, triploid, which means they are sterile oysters, in Chesapeake Bay and are making some money at it.

Third, restoration works. And I might take this opportunity, if I may, to clarify a statistic that has been widely bandied about, that $58 million has been spent on restoration of the bay oyster over the last decade or more. That is simply an incorrect number. $17 million has been spent on restoration. The balance has been spent on basically a put-and-take fishery, moving oysters from one area to another to try and circumvent disease, building oyster reefs and bars that then would be harvested. But really, the total dollars that have been spent on restoration, when you think of what has been lost and what is at risk, is not nearly enough.

Senator CARDIN. Thank you.

Do you have a view on the menhaden as to whether there needs to be better management of the taking of the menhaden?

Mr. BAKER. Absolutely. The menhaden fishery, as you know, is primarily a Virginia fishery. Virginia still uses large trawlers to harvest menhaden, and menhaden are a filter feeder similar to oysters and other shellfish.

The Atlantic States Marine Fisheries Commission instituted a 5-year window of opportunity in which the fishery is capped to allow the scientists to come up with the best number possible as to what the sustainable harvest is. Once that number is available, we ought to follow the science once again and meet that, and whatever it takes to meet it should be followed.

Senator CARDIN. Well, I think management is a critical issue. You mentioned the rockfish, that it seems like it is going to be a good season, although my brother went fishing yesterday and did not catch anything. He is a pretty good fisherman. So we will see.

Of course, the crab crop looks like it is going to be better, certainly better this season than last.

Congressman Connolly, I want to ask you about what practices you are using in regards to looking at dealing with the runoff. It is amazing to me because I have seen some very practical ways of dealing with runoff issues that look like it is economically feasible. It is less expensive than pouring all that concrete. It certainly looks better and is much better for the environment. I personally believe the Federal Government has got to be a leader here in the way that we do our construction, whether it is roads or buildings, that we have a clear policy on minimizing the negative impact on the bay and that we lead by example and then show the right practices that can be economically achieved.

In your experience, can you tell us what could be the best policies to try to make this as economically feasible as possible, achieving our environmental results? Any lessons learned from what you did in Virginia?

Mr. CONNOLLY. I think there are, Mr. Chairman, and I hinted at it a little bit earlier with our exchange with Mr. Fox. I do think that some kind of standard set by the EPA on low-impact development could make a difference because you made the point that you do not want to do an undue burden on business, but if one locality wants to do the right thing and have certain requirements of businesses as they are doing new development or retrofitting existing development, and the neighboring jurisdiction has none, you have put yourself, trying to do the right thing, at a competitive dis-

advantage. And so having a uniform standard on low-impact development I think can make a difference.

We put up some pictures here, Mr. Chairman, of three examples in Fairfax County we did as a government that were not terribly expensive and they had very dramatic improvements in the treatment of runoff.

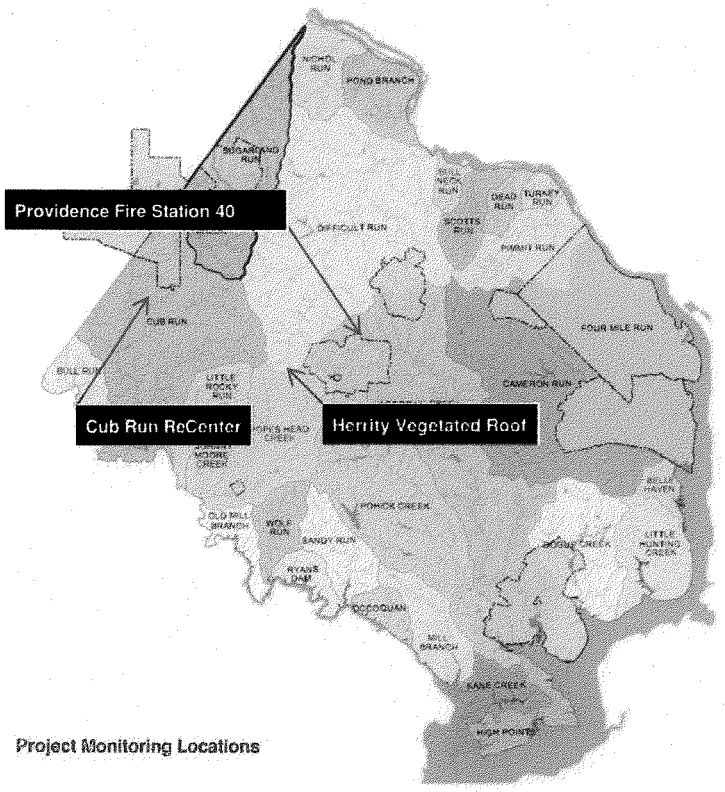
This first one was a recreation center where in the drainage area, about 23–24 percent of the drainage area we turned into a rain garden and got very dramatic improvements in terms of the runoff that was retained, about 47 percent.

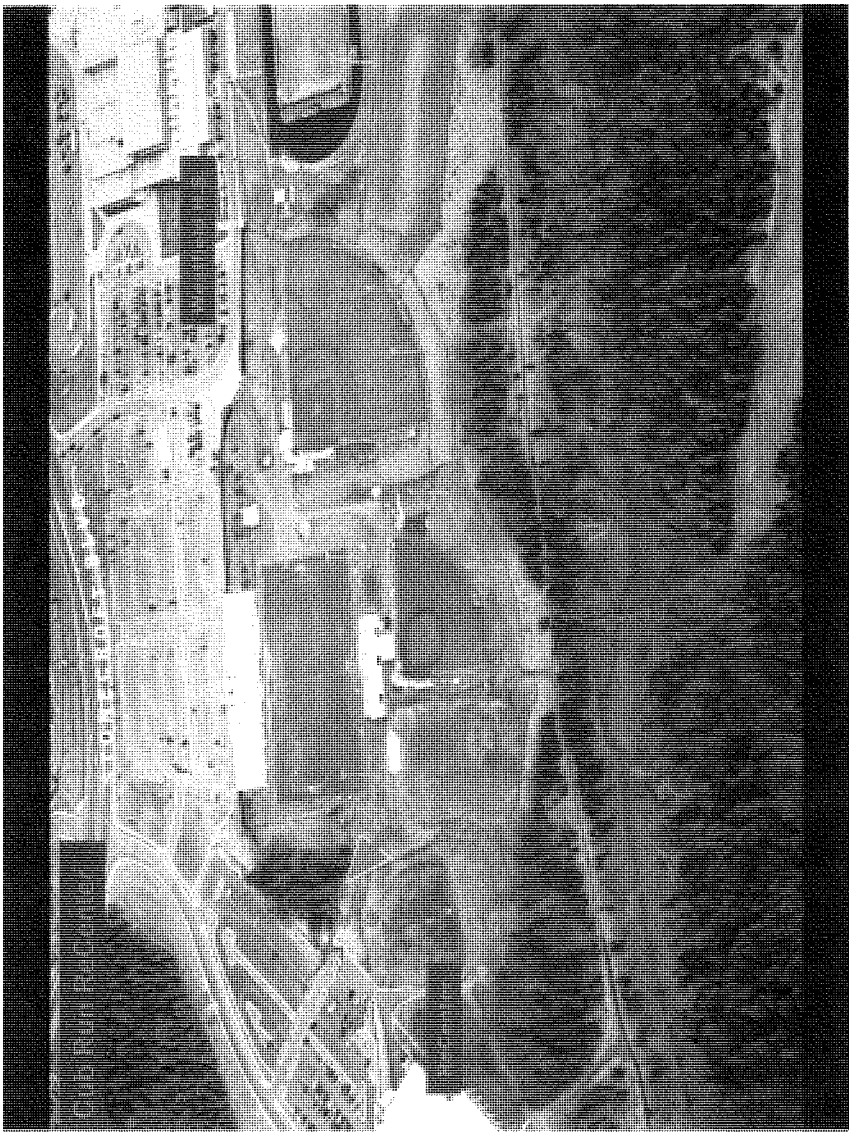
The second picture is an example of a roof garden where we took an impervious surface on a parking garage on a roof and basically turned it into a rain garden that has, in one case, retained 100 percent of the estimated runoff. I mean, really a dramatic improvement.

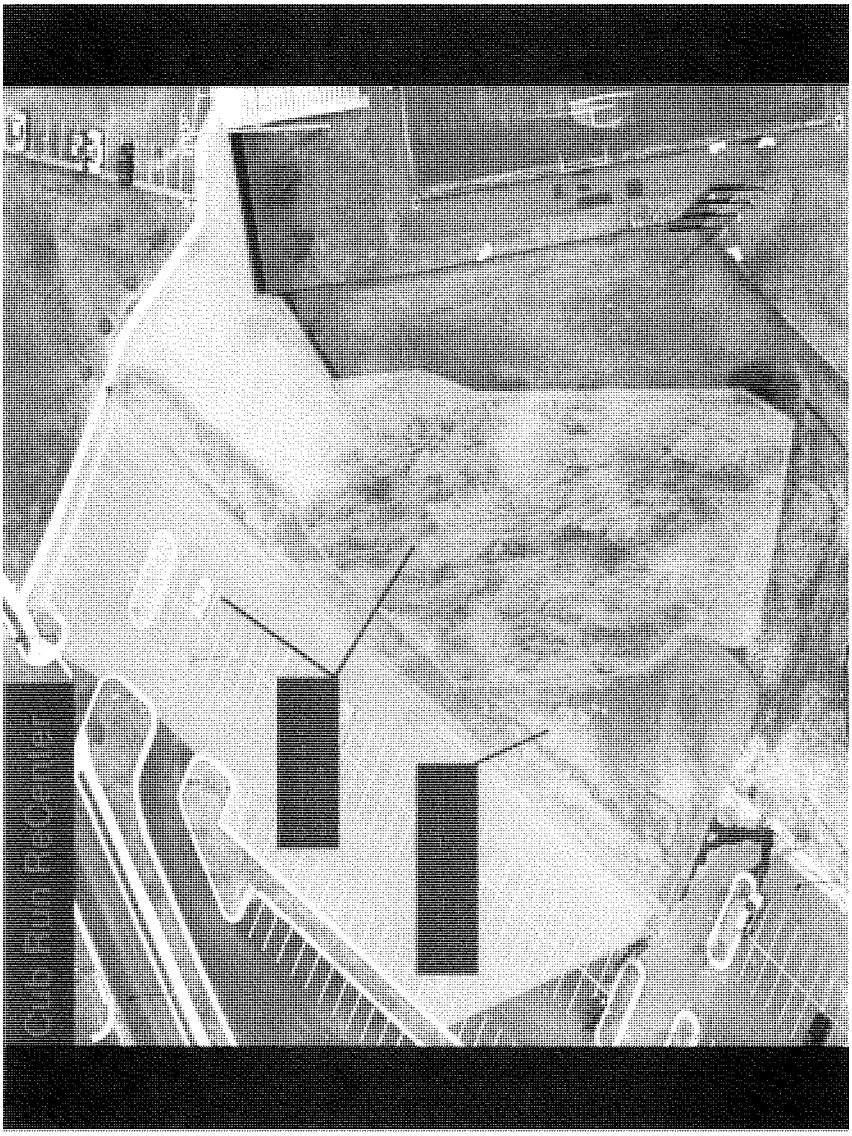
And the third example was a parking lot where we replaced asphalt with porous pavers and we instituted a retention trench that has also had a dramatic improvement. This is a government center and a fire station, heavily trafficked, and we have made a big difference. We are over 40 percent now of runoff being treated and retained.

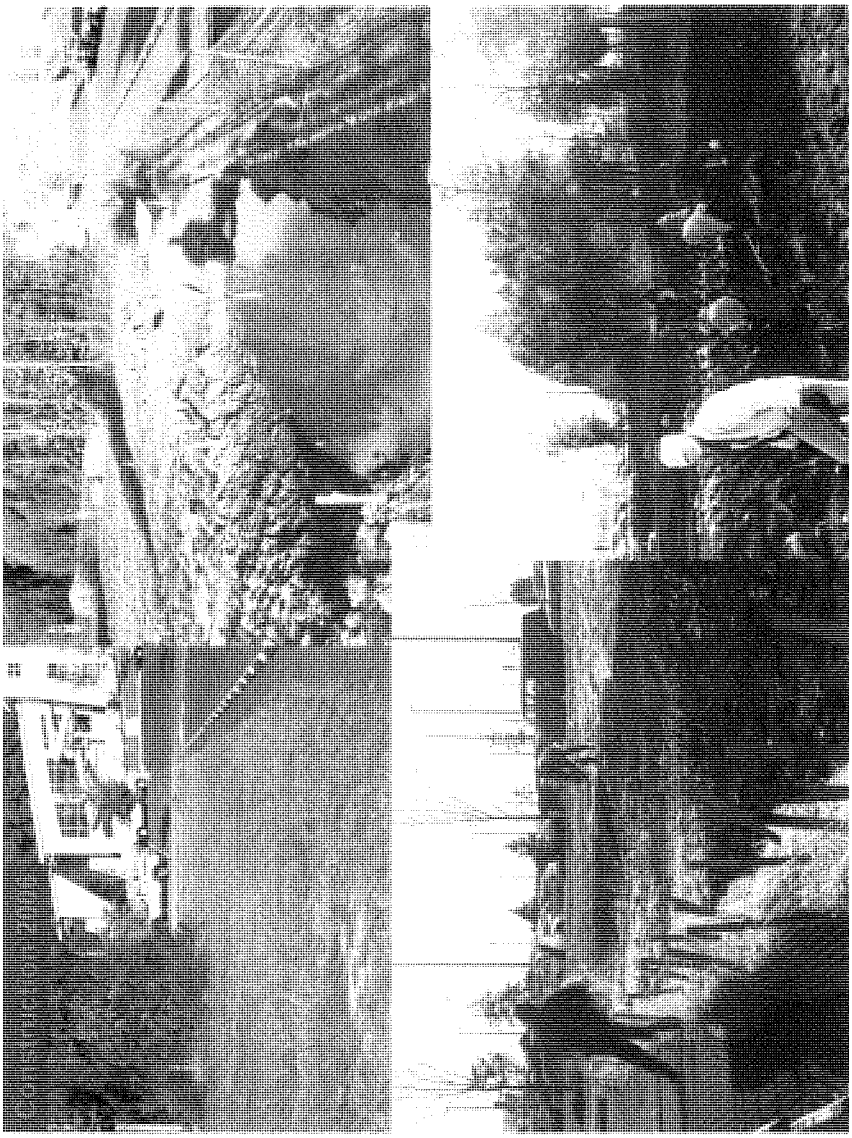
So these were just three examples of LIDs. You know, we are practicing what we are preaching, and we are finding developers more than happy to try to replicate this with a little bit of encouragement.

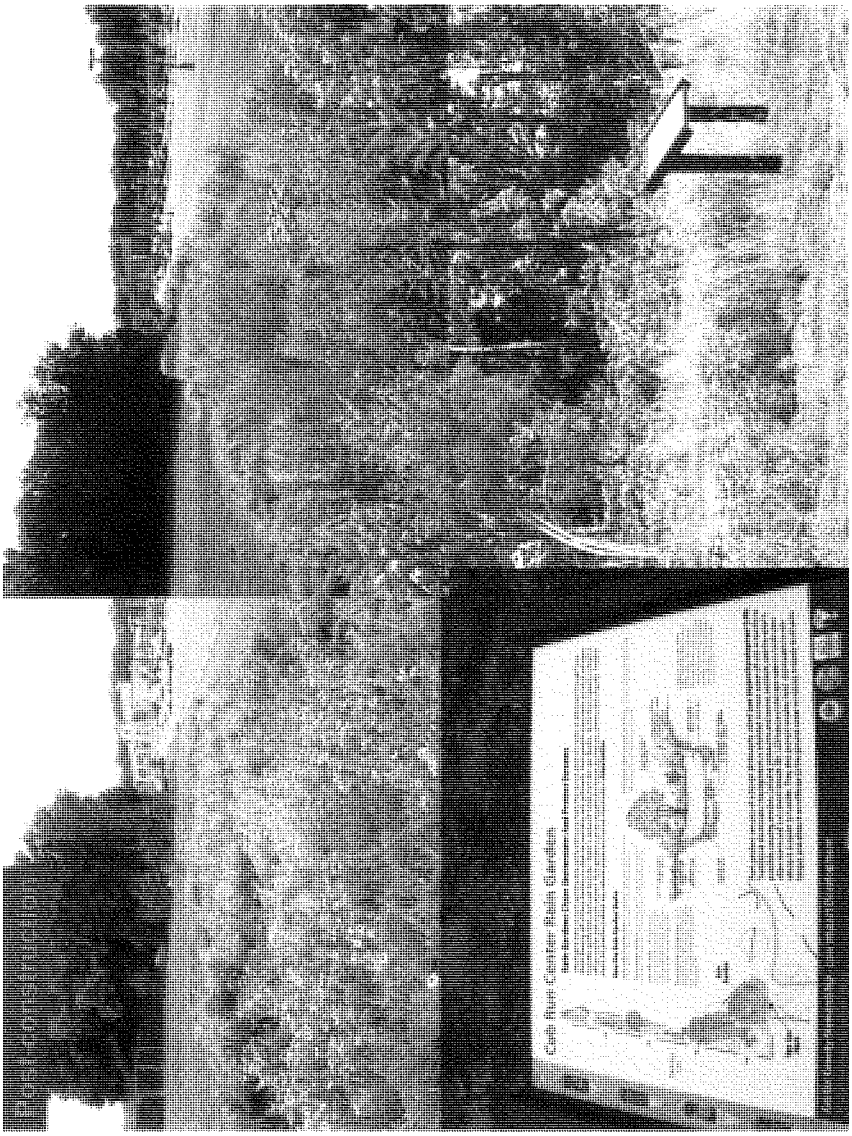
[The referenced material follows:]

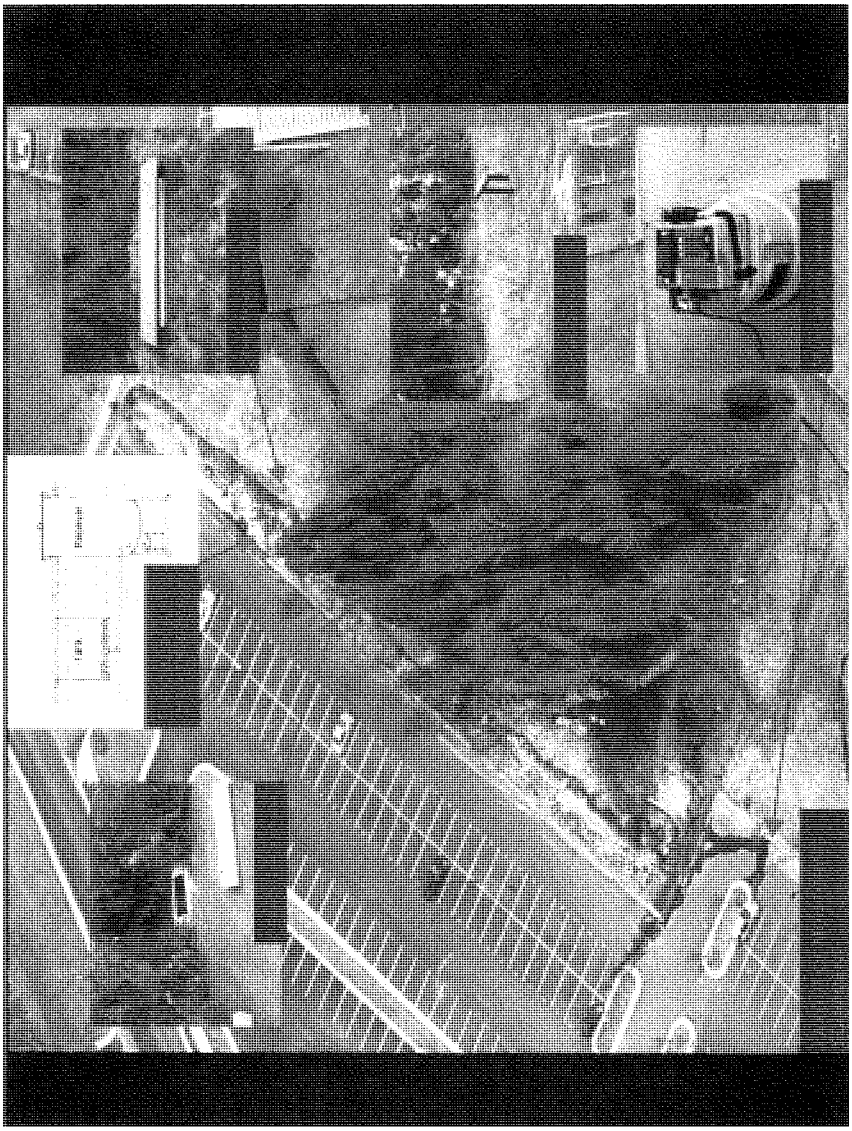

Providence Fire Station 40
Cub Run ReCenter
Herrity Vegetated Roof
POND BRANCH
SUGARLAND RUN
DIFFICULT RUN
SCOTTS RUN
DEAD RUN
TURKEY RUN
PIMMIT RUN
FOUR MILE RUN
CAMERON RUN
CUB RUN
BULL RUN
LITTLE ROCKY RUN
POHICK CREEK
WOLF RUN
SANDY RUN
RYANS DAM
OCCOQUAN
MILL BRANCH
KANE CREEK
HIGH POINTS
LITTLE HUNTING CREEK
Project Monitoring Locations

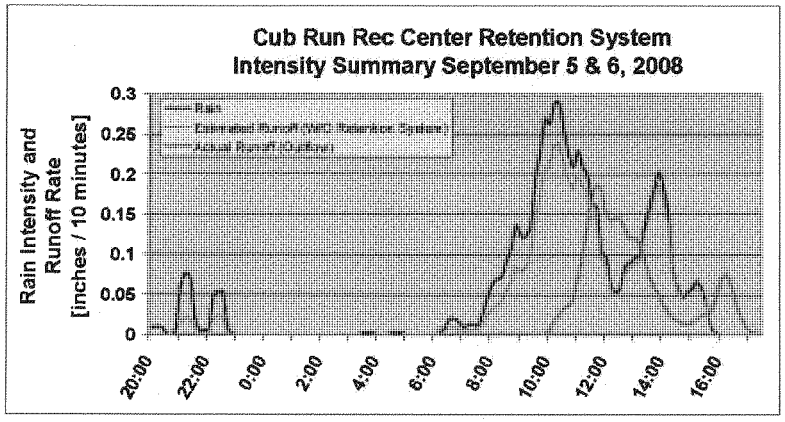






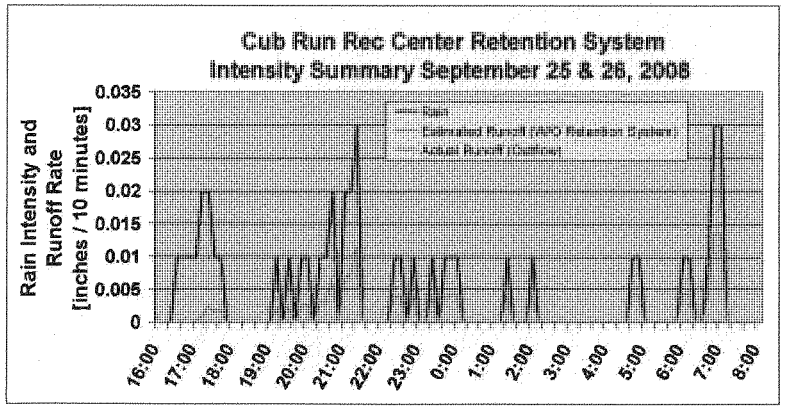






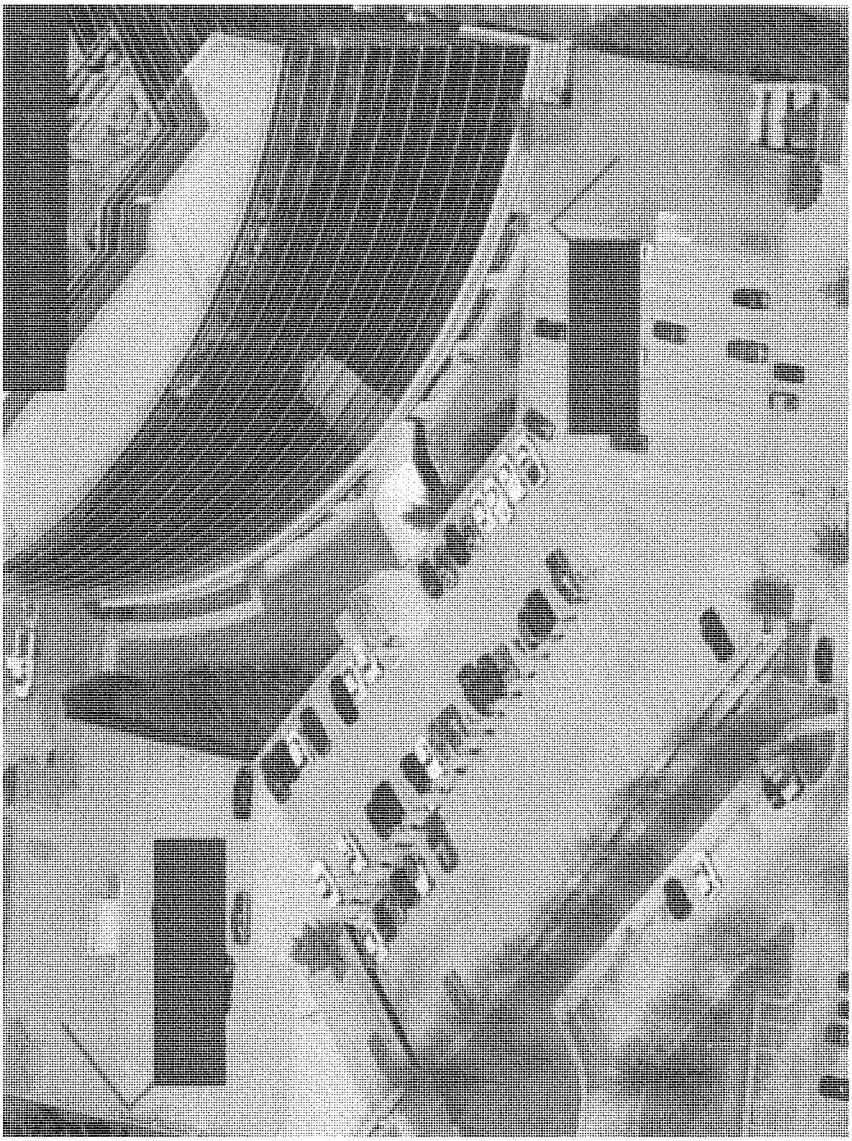
Total Rain =	7.06	inches
Estimated Runoff (W/O Retention System)=	5.56	inches
Actual Runoff (Outflow) =	2.93	inches
Rain Retained in System =	2.63	inches

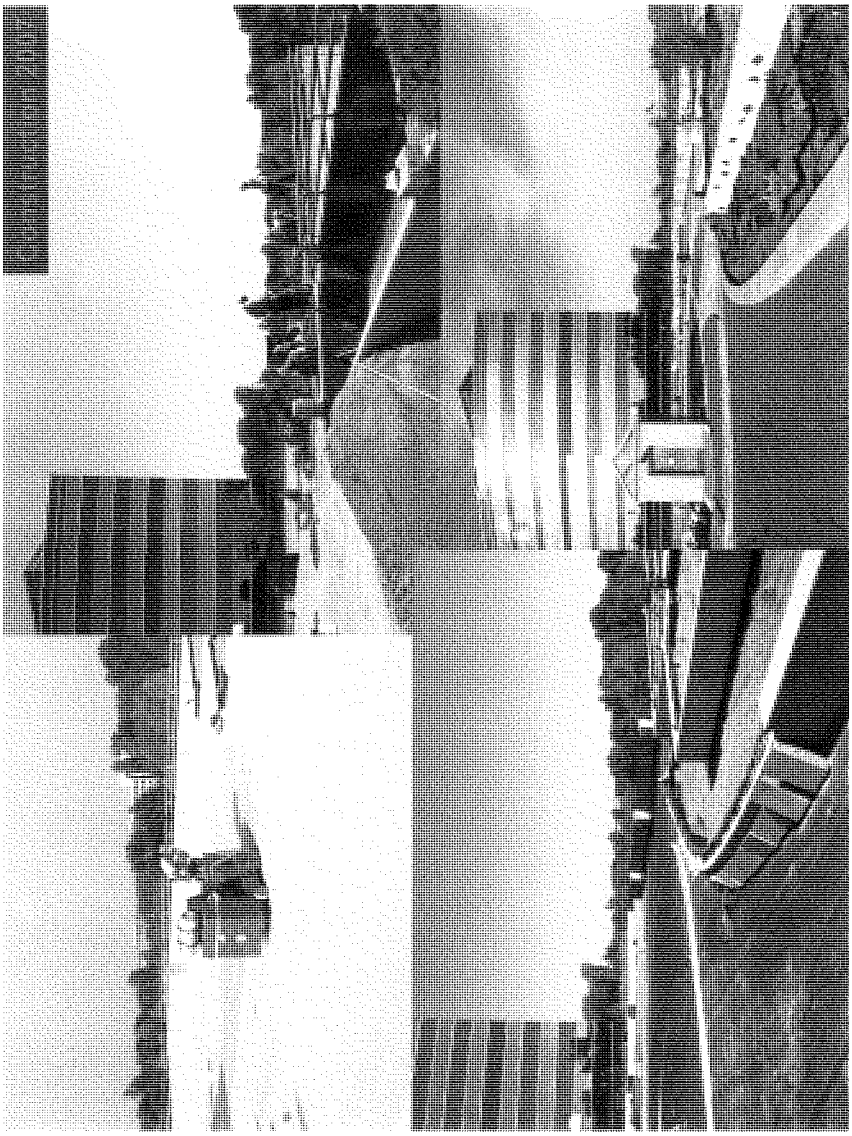
47.3 % of Estimated Runoff was retained

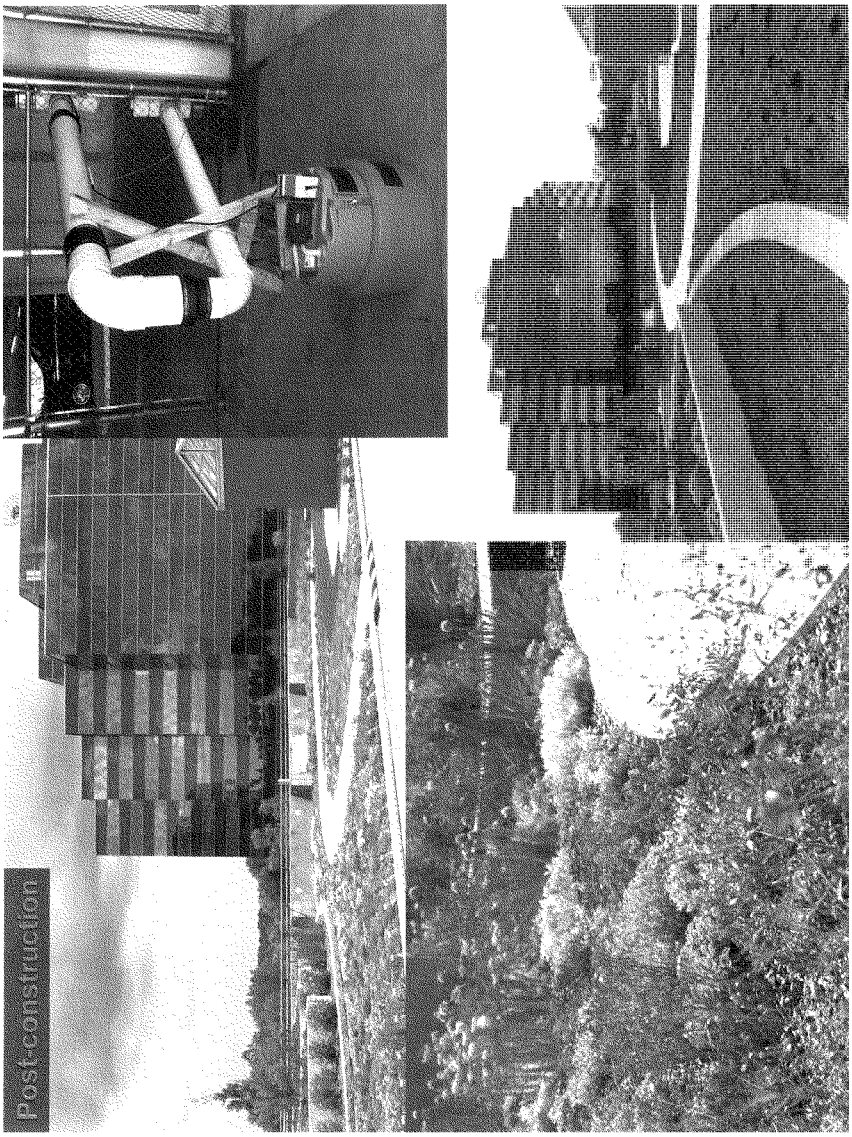


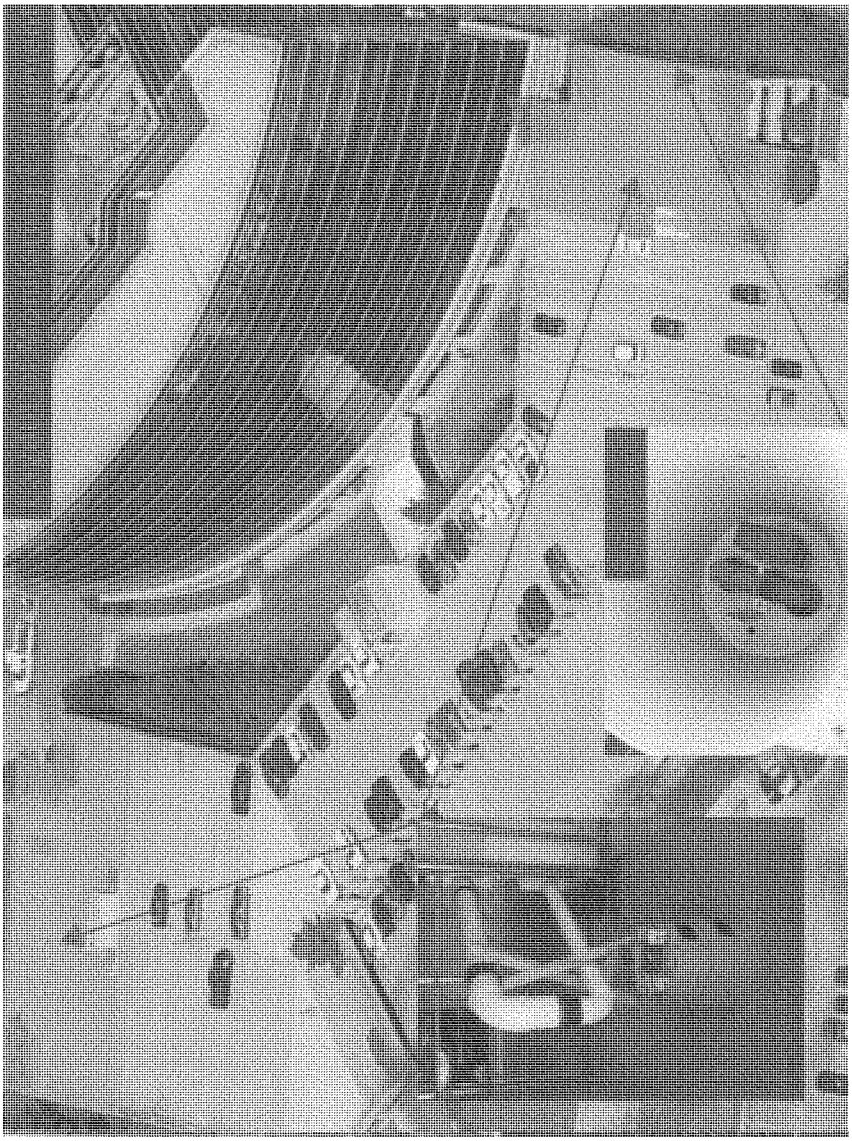
Total Rain =	0.45	inches
Estimated Runoff (W/O Retention System) =	0.14	inches
Actual Runoff (Outflow) =	0.00	inches
Rain Retained in System =	0.14	inches

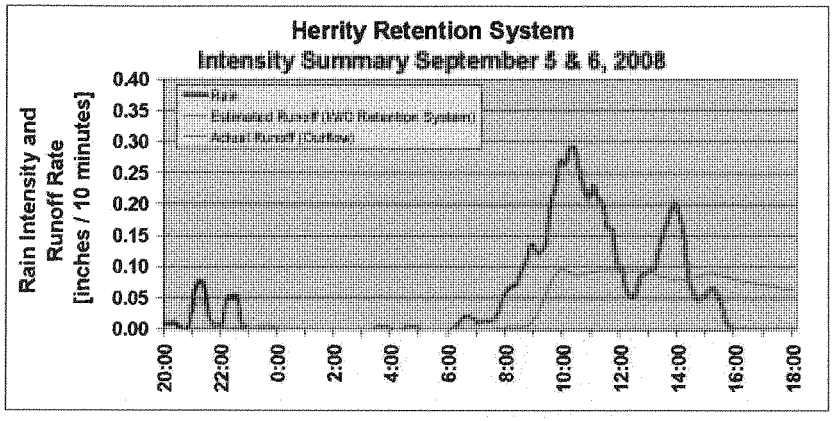
100 % of Estimated Runoff was retained






Post-construction





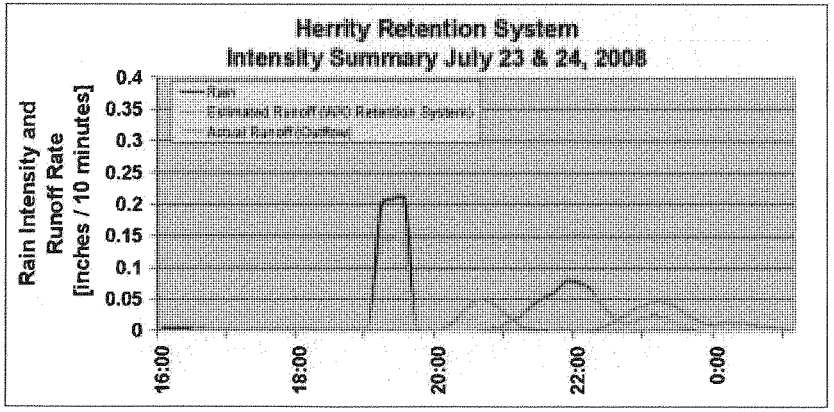
Total Rain = 7.06 inches

Estimated Runoff (W/O Retention System) = 6.82 inches

Actual Runoff (Outflow) = 6.32 inches

Rain Retained in System = 0.50 inches

7.3 % of Rain/Runoff was retained



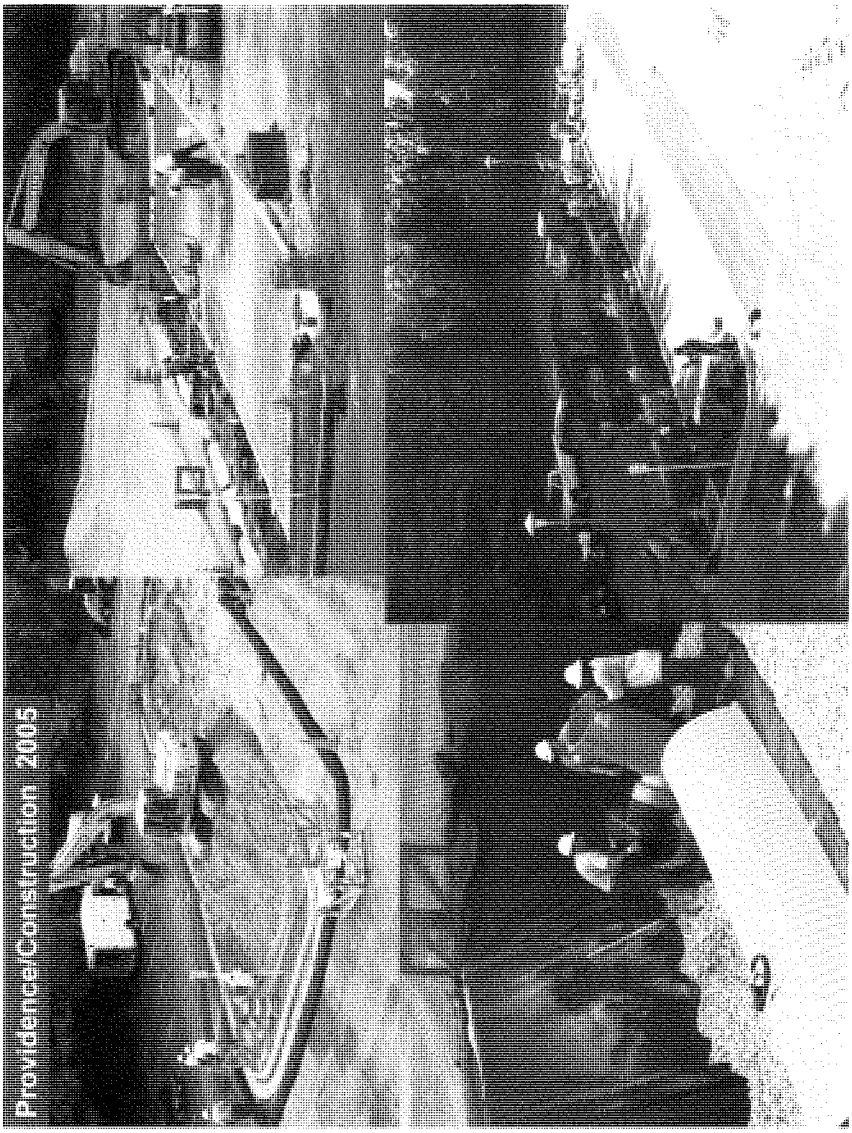
Total Rain = 1.23 inches

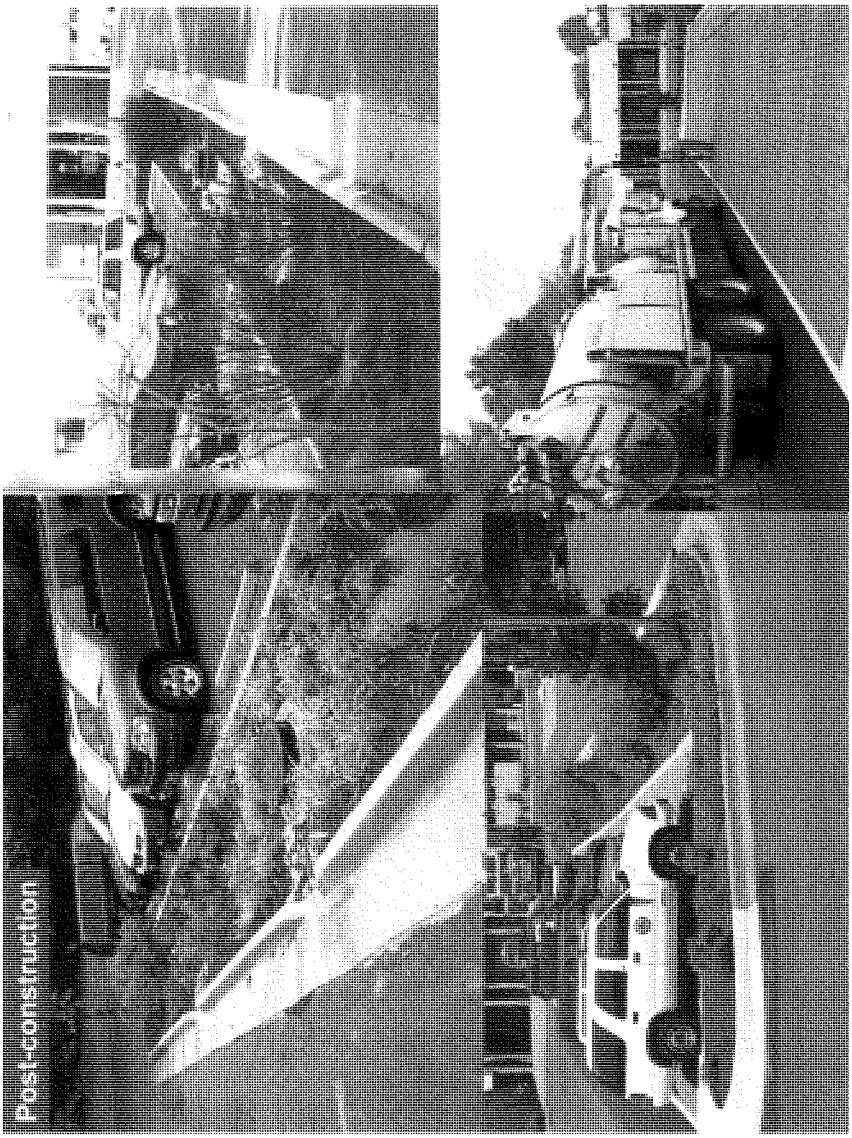
Estimated Runoff (W/O Retention System) = 1.01 inches

Actual Runoff (Outflow) = 0.57 inches

Rain Retained in System = 0.44 inches

43.8 % of Rain/Runoff was retained


Providence/Construction 2005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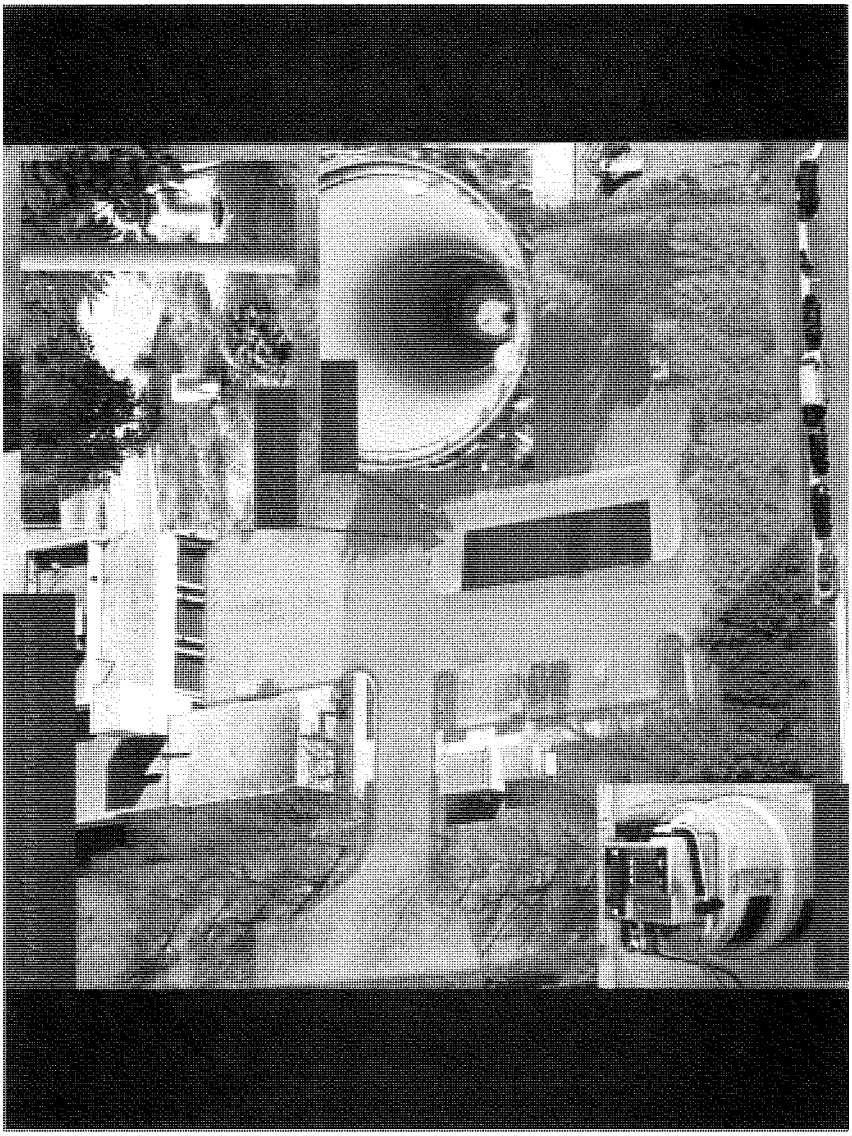
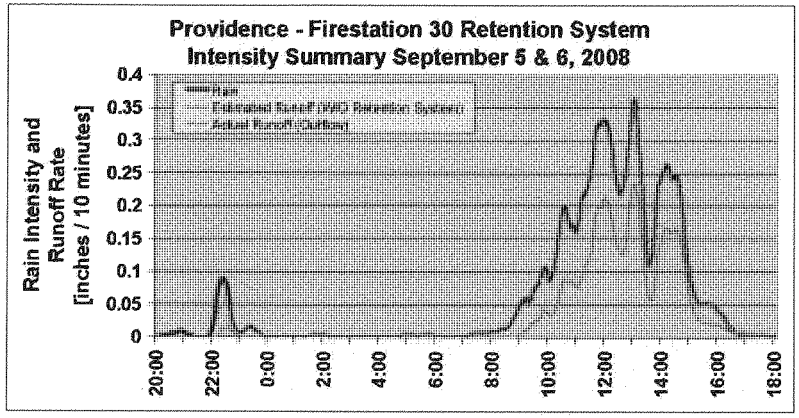




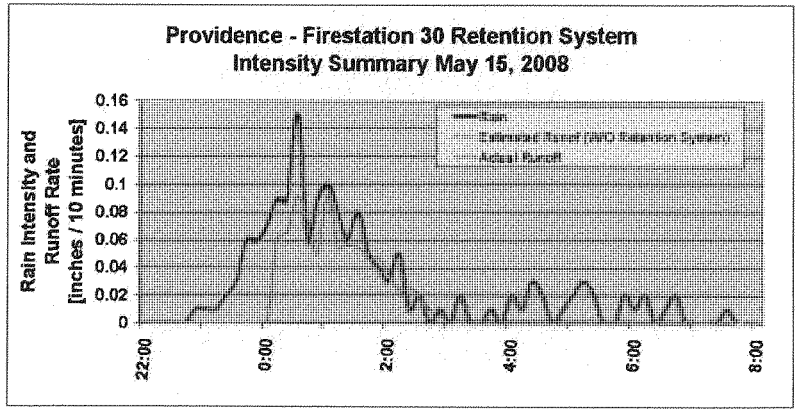
Total Rain = 8.16 inches

Estimated Runoff (Inflow) = 7.92 inches

Actual Runoff (Outflow) = 4.39 inches

Rain Retained in System = 3.53 inches

44.6 % of Rain/Runoff was retained



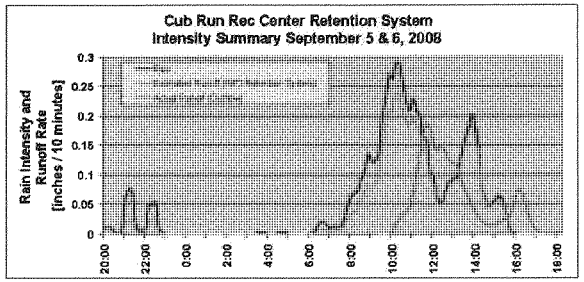
Total Rain = 1.56 inches

Estimated Runoff (Inflow) = 1.51 inches

Actual Runoff (Outflow) = 0.86 inches

Rain Retained in System = 0.65 inches

43.0 % of Rain/Runoff was retained



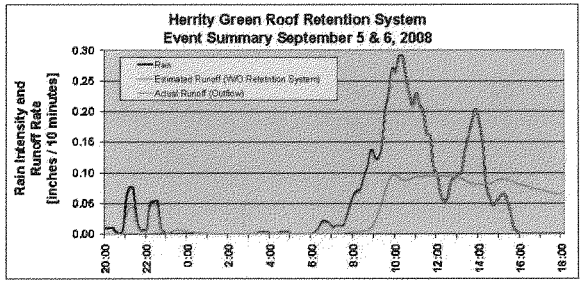
Total Rain = 7.06 inches

Estimated Runoff (W/O Retention System) = 5.56 inches

Actual Runoff (Outflow) = 2.93 inches

Rain Retained in System = 2.63 inches

47.3 % of Estimated Runoff was retained



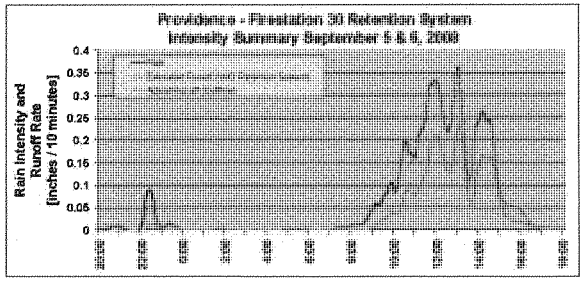
Total Rain = 7.06 inches

Estimated Runoff (W/O Retention System) = 6.82 inches

Actual Runoff (Outflow) = 6.32 inches

Rain Retained in System = 0.50 inches

7.3 % of Estimated Runoff was retained



Total Rain = 8.16 inches

Estimated Runoff (W/O Retention System) = 7.92 inches

Actual Runoff (Outflow) = 4.39 inches

Rain Retained in System = 3.53 inches

44.6 % of Estimated Runoff was retained

Senator CARDIN. As far as the cost differential, have you been able to document the extra costs?

Mr. CONNOLLY. It is hard to get at that delta, Mr. Chairman. Obviously, we have looked at, for example, in the replanning of Tysons7, that 3-year effort, the business community sat at that table, and to a person, the developers and the owners, including the largest single owner of property in Tysons, unanimously endorsed the LIDs that we put in the plan that would require 100 percent treatment of stormwater and would implement these kinds of measures to try to make for a more efficient and environmentally sensitive Tysons Corner. So I cannot give you a delta just yet, but I can tell you that we are not finding a lot of resistance from the business community.

Senator CARDIN. And in some cases, the maintenance costs are going to be less.

Mr. CONNOLLY. Absolutely.

Senator CARDIN. We saw that in legislation that I was working on on GSA buildings that the cost issues really were not there. I mean, it is not extra cost. It is just paying attention to the environment and doing it the right way.

Mr. CONNOLLY. In public buildings, Mr. Chairman, what we found in the public sector, roughly the life of a building is somewhere around 40 to 50 years, and we find the break-even point with these investments is around year 11. So after that, you are actually net making money in terms of savings and maintenance and operation.

Senator CARDIN. And Mr. Fox, looking again at your pie chart, all three, nitrogen, phosphorus, and sediments, are very much impacted by runoff. So it seems to me this is one that we could make some significant progress.

Mr. FOX. Absolutely, and my hope is that with the emergence of this next generation of stormwater permits for urban and suburban areas, we will see an increasing tightening of these permit conditions and higher performance of precisely these kinds of things.

Senator CARDIN. Well, let me thank our witnesses, all four of you. This is the first of a series of opportunities we are going to have to try to deal with the Clean Water Act, deal with the Chesapeake Bay Program, to try to develop the right governmental structure, and working with this administration, which we believe is very much in step with what we are trying to accomplish in Congress on the Chesapeake Bay.

There has been a lot of effort put into the bay—there is no question about it—by the agricultural community, by local governments, by the private interest groups, by children who go out on the weekends to clean up the bay, and it has made a difference, as I said in my opening statements. But we are at a D in our grading system and that is not acceptable. We are in poor quality. That is not acceptable.

So we need to look at ways to do it consistent with what Mr. Hutchison said. We want it to be based upon good science. We want it to be fair. We do want to create an undue burden on our economy. We think we can achieve those goals. But I really do think we need the help of all of you, all the stakeholders, in order to achieve that objective. I can tell you that this committee is very

much interested in working with each of you to develop legislation and try to move legislation through Congress and to give the administration the tools they need, whether they are financial or regulatory, to achieve these objectives.

The record will be open for 2 weeks for additional comments that any of you would like to add or by members of our committee. Again, I thank you all for your participation.

With that, the hearing will stand adjourned.

[Whereupon, at 11:43 a.m., the hearing was adjourned.]

[Additional material submitted for the record follows:]

Blue Plains 2009
Reducing Nitrogen at the Point Source

The largest point source of nitrogen pollution in the Chesapeake Bay watershed sits on the banks of the Potomac River in our nation's capitol. Blue Plains Advanced Wastewater Treatment Plant is the largest facility of its kind in the country, treating wastewater from over two million customers in all of the District of Columbia, southern Maryland and northern Virginia. In the past decade these three jurisdictions have invested almost $700 million to upgrade the facility, with the Federal government contributing grants of about $135 million. However, significantly greater investment is needed to reduce the amount of nitrogen pollution discharged from the plant to meet the new permit limit set by EPA and to further Bay restoration goals.

Because of its sheer size and its location in the headwaters of the Bay, improving nitrogen reduction controls at Blue Plains will be massively beneficial for Bay restoration efforts: enhanced nutrient removal technology will prevent up to four million pounds of nitrogen from reaching the waters of the Bay every year. Increased Federal funding is critical to accomplish this monumental task, especially when combined with a $2.2 billion Long Term Control Plan to fix the District's antiquated Combined Sewer Overflows.

This fact sheet provides background information on Blue Plains and updated projected costs for the District's CSO and enhanced nutrient reduction plans.

Basic Facts about Blue Plains

- Located in the District of Columbia, Blue Plains (BP) services all of DC, portions of Montgomery and Prince George's Counties in MD and Fairfax and Loudoun Counties in VA.

- Capacity of treatment at BP is 370 million gallons/day (mgd), currently running at 330 mgd.

- DC Water and Sewer Authority (DC WASA) is under a consent decree (2005) to implement a **Long Term Control Plan** (LTCP) reducing 96% of Combined Sewer Overflow (CSO) volume by 2025 over 1996 levels; cost **$2.2 billion**. In a year of average rainfall DC WASA estimates that over 2 billion gallons of combined sewers overflow into the Anacostia and Potomac Rivers and Rock Creek.

- BP is at the limit of technology for **phosphorous** (P) removal, 0.10 mg/l, with a permit limit of 0.18 mg/l.

New Prospects for Nitrogen Removal

- **EPA has set a new permit limit for nitrogen** (N) at BP:
  4.2 mg/l or **4.7 M lbs/yr** (down from current permit goal of 7.5 mg/l or 8.5 M lbs/yr).
  To meet the new N limit, BP design criteria will be 3 mg/l, or 3.8 to 4.0 M lbs/yr.

- Although the new permit limit and compliance schedule have been facing many legal challenges, DC WASA still expects to be in compliance with the new N limit by July 1, 2014.

Average N discharged at Blue Plains

Year	Annual Pounds	Effluent Concentration
Old permit goal	8.5 M lbs/yr	7.5 mg/l
2005	5.2 M lbs/yr	5.3 mg/l
2006	5.3 M lbs/yr	5.7 mg/l
2007	5.4 M lbs/yr	5.9 mg/l
2008	6.7 M lbs/yr	7.5 mg/l
New permit limit 2014	4.7 M lbs/yr	4.2 mg/l

Costs

- **Cost allocation for CSO 20 year LTCP:**
  100%=DC rate payers, unless federal funds are appropriated (see Potential Funding Sources below). The cost estimate is **$2.2 billion**.
  - On May 1, 2009 DC WASA will begin a new sewer charge to separate out sewer services and the cost for the LTCP. The current metered sewer charge will be lowered and an Impervious Surface Area Charge will be added, based on the amount of impervious surface on a parcel. The new fee is based on an Equivalent Residential Unit (ERU) or 1,000 square feet. Residents will initially be charged about $1.24 a month. Non-residential customers will be assessed on the total amount of impervious surface area on each lot, which will be converted into ERUs.

- **Total Nitrogen Removal/Wet Weather Plan,** (TN/WWP) **$1.063 billion** includes:
  1. Tunnel from Poplar Point to BP to store 31 M gals of stormwater; $260 M.
  2. Enhanced Nutrient Removal facility; $576 M
  3. Enhanced Clarification Facility for excess flow treatment; $227 M

  - **Estimated cost allocation for TN/WWP:**
    $1.063 billion (note: at least 3% per year inflation will apply to this amount)
    Current capital cost allocations for BP's per Inter-Municipal Agreement based on flow allocation:

TN/WWP Estimated Cost Allocation

Jurisdiction	Flow Allocation	Amount of Total Flow	Cost Allocation
District of Columbia	153 mgd	41%	$436 M
WSSC*	170 mgd	46%	$489 M
Fairfax Co.	31 mgd	8%	$85 M
Loudoun Co. & Dulles Airport, NPS, US Navy	17 mgd	5%	$53 M
total	371 mgd	100%	$1,063 M

*Washington Suburban Sanitary Commission (MD counties)

- **Projected TN/WWP Spending Plan**
  How much money is needed each year?

In millions of dollars

FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18		Total
$10	$42	$43	$62	$92	$221	$234	$105	$76	$89	$62	$27		$1,063

Potential Funding Sources

- MD share:
  - Bay Restoration Fund grants
  - MD Water Quality Revolving Loan Fund low interest loans
  - Rate payers
- VA share:
  - Water Quality Improvement Fund grants
  - VA Clean Water Revolving Loan Fund low interest loans
  - Rate payers.
- DC share:
  - Rate payers
- Federal share:
  - **Direct construction grants** through the CWSRF. DC cannot establish their own SRF program, so WASA receives funding directly from EPA.

    Recent history of CWSRF funding (in millions of dollars):

2003	2004	2005	2006	2007	2008	2009	09 Stimuls Pkg
$6.5	$6.5	$5.2	$4.2	$5.2	$3.2	$1.3	$19

- Recent line-item appropriations in **EPA's appropriation bill** to WASA for CSO work (requiring a 45% local match):

2002	2003
$1.7M	$700,000

- Funding to WASA through **DC Appropriations,** specifically for the CSO LTCP (requiring 100% local match) in millions of dollars:

2003	2004	2005	2006	2007	2008	2009
$50	$30	$4.8	$7	$7	$8	$16

- **2007 Water Resources Development Act**:
  This Act authorized $30 M for nutrient removal, and $35 M for CSO LTCP, but no appropriations have been made.

April 24, 2009

Chesapeake Bay Commission
Policy for the Bay

CHESAPEAKE BAY COMMISSION
ANN SWANSON, EXECUTIVE DIRECTOR

TESTIMONY

Chesapeake Bay Restoration: Status Report

Senate Environment and Public Works

Field Hearing

Host: Senator Benjamin Cardin
April 20, 2009

Thank you Senator Cardin for offering me the opportunity to provide suggestions for how best you and the U.S. Congress can help to accelerate the Chesapeake Bay restoration. My name is Ann Pesiri Swanson. I am here representing the Chesapeake Bay Commission. As its Executive Director for the past 21 years, I would like to express the members' deep appreciation for your continued leadership on so many issues critical to the Bay's restoration – from the Farm Bill, to Bay Appropriations, to the Chesapeake Bay Gateways Program. We are delighted to learn that you were appointed Chairman of the Water and Wildlife Subcommittee of the Senate Environment and Public Works Committee. As you know, this subcommittee has jurisdiction over many programs and agencies vital to our efforts to restore the Bay.

Over two decades ago, the states surrounding the Chesapeake Bay joined with the Federal government to acknowledge our stake in the resources of the Bay and to accept our share of responsibility for its condition. Yet, despite ambitious programs to protect our shared resource and restore it to a more productive state, there is much more to be done. There is a real need to do more of what we already know to do, to innovate in new directions and to do both at an accelerated rate. This, quite candidly, is unlikely to happen without continued Congressional leadership and greater Presidential engagement.

Because financial resources remain finite, now more than ever it is critically important to focus our efforts on the most cost-effective activities in specific, targeted areas of the watershed. To that end, the Chesapeake Bay Commission recommends action that will have the greatest effect on improving water quality within our rivers and the Bay, including a range of issues that will strengthen existing law to increase accountability at the regional, state, and local level, utilize pertinent Federal legislation to achieve critical stormwater control measures, engage the powers of the Executive branch to recognize the Chesapeake as a National Treasure, significantly address the watershed's single largest point source of nitrogen pollution, and enhance budget measures that will provide the most cost-effective use of limited funds.

You have asked me to provide an update on the Bay's health and to recommend near-term priorities that can help to accelerate the Bay's restoration while working with the Obama Administration. Dr. Donald Boesch, as the senior scientist among us, will surely focus on the

state of the Chesapeake. Thus, suffice it to say that the Chesapeake Bay and its tributaries are unhealthy, primarily because of pollution from excess nitrogen, phosphorus and sediment entering our waterways. The main sources of this pollution include agriculture, urban and suburban runoff, wastewater and air. It is these sources that also offer our best near-term solutions.

It is well worth repeating that without enhanced state and federal support, in both dollars and policy, we do not believe that the Bay's health can be restored. Federal policy and funding has served a catalytic role for action in the region. We continue to need Federal support to help us to better target what funding is available and to apply policy guidance and accountability in ways that the states are unable.

Farm Bill Funding

The Farm Bill provides an outstanding example of the Federal government's assistance in leading by example. You recently more than tripled agricultural support via the 2008 Farm Bill. Agriculture presents one of the two most cost-effective opportunities in the Bay region to reduce nutrient and sediment loads. The U.S. Congress has invested wisely and even provided us with a special Chesapeake provision designed to target investments by both practice and geography. The onus is now on the region to deliver the anticipated water quality gains. We ask that the Congress stand vigilantly by these funds, particularly the Chesapeake Watershed Program dollars, to ensure that the programs are implemented as intended.

Wastewater Treatment Plants

The other most cost-effective opportunity involves wastewater treatment plants. Via the Clean Water Act, the Clean Water State Revolving Fund (CWSRF) is a critical source of funding for upgrades to wastewater treatment plants to meet water quality goals. In addition, CWSRF dollars are exceeded by the states and rate payers, significantly leveraging the federal investment. While this program has allowed the region to have some of the most advanced wastewater treatment plants in the nation, many of our plants are still in need of upgrades

Federal funding had been declining since the late 1990's. More than $4 Billion in CWSRF dollars included in the American Recovery and Reinvestment Act has put the nation, and our region, back on track, but, these huge increases are only temporary. It is important to note that the SRF can also be used to address agricultural pollution, stormwater runoff, combined sewer overflows and other impairments. President Obama has included in his FY2010 budget $2.4 billion nationwide for clean water SRF and $1.5 billion for drinking water SRF. This proposal would reverse almost a decade of decline in Federal funding and should be supported. Furthermore, when the Clean Water Act is reauthorized, the CWSRF should be made to better address nonpoint sources of water pollution. These funds, like the Recovery and Reinvestment dollars, should be provided in the form of both loans and grants.

There is another wastewater issue that deserves significant Federal attention: Blue Plains Wastewater Treatment Plant. Blue Plains treats the wastewater from the entire District of Columbia and portions of southern Maryland and northern Virginia. It is, for all intent and purpose, the nation's sewage treatment plant. When upgraded, this regional wastewater treatment plant will significantly reduce the amount of nitrogen released into the headwaters of the Chesapeake by 4 million pounds per year, representing *the* largest single pollution control action in the watershed. The Recovery and Reinvestment package and WRDA have recently supported this effort, but only in small ways. Blue Plains is currently under court order to correct its CSO and the long-term control plan places an enormous burden on the District's rate payers. While

construction is underway, there is enormous opportunity to simultaneously retrofit the plant to state-of-the-art nitrogen removal, taking the nitrogen-discharge down to 3-4 mg/l. The cost: nearly $1 billion for Enhanced Nitrogen Removal and another $2 billion to correct the capital's CSO. However, spread out over years, Blue Plains presents one of the most cost-effective and sure-fire opportunities to control pollution in the watershed. We ask the Congress to make Blue Plains its highest Wastewater Treatment Plant priority to transform the nation's WWTP into a model for the world.

Reauthorization of Section 117 of the Clean Water Act

A reauthorized Clean Water Act must do more to address the most prominent causes of water degradation within the Bay watershed. "More" comes in the form of *both* dollars and policies. With a clean water restoration price tag of over $20 billion dollars, the Federal EPA share is disproportionately small: $40 million authorized yet never fully appropriated. We ask that you consider full funding of the Program in FY2010 and increasing its authorization when Section 117 is reauthorized. Of course, both of these should come with strong accountability measures as you have triggered in the recent past.

In addition to financial support, we urge the Chesapeake Bay area Congressional Delegation to strengthen language within the Clean Water Act to better ensure a Bay-wide Total Maximum Daily Load (TMDL) is effective and enforceable, and is sufficiently developed and fully implemented to achieve the necessary nutrient and sediment reductions. This could be done via Section 117, making the Bay restoration a model for the nation, or through a change at the national level.

Currently, the Clean Water Act applies to all point sources of pollution including wastewater treatment plants and industrial discharges, municipal stormwater (limited to larger and mid-sized cities) and the Concentrated Animal Feeding Operations (including only the largest animal operations in the watershed. However, there are many sources of pollution that fall outside the scope of the Clean Water Act. To protect a system like the Chesapeake, where the majority of the nitrogen pollution comes from nonpoint sources, we must be sure that all sources are controlled in meaningful and highly accountable way. The Clean Air Act offers some useful models.

At a September 2008 meeting of the Chesapeake Bay Commission, a number of state representatives called upon EPA for further guidance and oversight. Congress has the opportunity to ensure that load allocations from nonpoint sources and wasteload allocations from point sources are met within the Chesapeake Bay watershed. A reauthorized Section 117 should include clear and instructive provisions that include:

1. Any Chesapeake Bay watershed-wide TMDL must include both "how" to achieve implementation and also "when" it will occur;
2. A Bay TMDL must require contingencies or communicate consequences for unattained load allocation goals;
3. Assurances and verification that practices and loads are being met, particularly with nonpoint source control plans, must play a critical role;
4. Both wasteload allocations from point sources as well as load allocations from nonpoint sources needed to remove the Chesapeake Bay from EPA's "impaired waters" list must be quantifiable and consistently, amply, and comprehensively measured; and
5. The Clean Water Act could facilitate the use of watershed permitting where appropriate to increase local flexibility along with accountability.

Two examples of past TMDLs that we suggest may be helpful guides for developing a sound and enforceable TMDL for the Bay watershed are (1) Long Island Sound Nutrients TMDL (decision rationale published April, 2001) and the Northeast Regional Mercury TMDL (decision rationale expected December, 2008).

The Long Island Sound Nutrients TMDL offers a good example that can be expanded and improved upon for integrating a schedule with metrics into a TMDL. And the Northeast Regional Mercury TMDL offers a good example for a multi-jurisdictional plan that can involve all stakeholders at all levels of government in achieving load allocations outlined in a TMDL.

Reauthorization of the Surface Transportation Act

Transportation-related land uses have the second highest level of pollutant concentrations, with piped industrial sources being the highest. Indeed, runoff from highways and related facilities constitutes a major part of the national water pollution problem. Most Federal Aid Highways were built prior to this understanding, and therefore lack any stormwater controls. But best management practices to mitigate such impacts are now known and well understood. While states are required to meet EPA stormwater regulations in constructing new highways, no such requirements exist to mitigate pollution from existing highways and associated paved surfaces. States are allowed to use Federal Aid Highway funds for this purpose, but few states do because of competition with other state priorities.

In the Chesapeake Bay watershed, highways account for 22 percent of urban nitrogen and 32 percent of urban phosphorus; 36 million pounds of nitrogen annually fall on Maryland alone from mobile and highway loads combined. One third of that, 12 million pounds, comes from mobile sources; By comparison, wastewater treatment plants contribute 17 million pounds of nitrogen a year.

A study in Wisconsin showed that roadways produced some of the highest concentrations of phosphorus, suspended solids, bacteria and heavy metals. And a North Carolina Department of Transportation study showed that atmospheric sources related to automobiles accounted for up to 90 percent of nitrogen found in runoff from urban highways. Of the 42,256 impaired waters on the national 303(d) list, 28,000 of the impairments are directly related to highway runoff. Unfortunately, over 28 percent of the impairments (12,001 water body segments) are located within the Chesapeake Bay watershed jurisdictions. (DE 101; DC 27; MD 501; NY 610; PA 6,957; VA 2,534; WV 1,271).

Improved stormwater management is a national challenge presenting a vexing problem in the Chesapeake. And there are many opportunities throughout SAFETEA-LU to target correcting the negative impacts from our existing Federally-funded roadways. Therefore, we ask Congress to establish new programs to mitigate the impacts of stormwater runoff from highways and related impervious surfaces in the reauthorization of the SAFETEA-LU.

Presidential Executive Order

The powers of an engaged and proactive Executive Branch at the Federal level could provide much needed added value to the Bay restoration effort. Therefore, we ask Congress to join us in calling for the President to issue an Executive Order recognizing the Chesapeake Bay as a National Treasure and elevating regional restoration efforts as a top environmental priority for the nation. We have joined Governors Kaine and O'Malley along with the other watershed state

leaders in requesting an Executive Order and ask for our support in finally bringing the Presidential attention to the Bay that it unquestionably deserves.

Without an engaged and educated public, I do not believe that the Bay can be fully restored. A survey was released recently reporting that 86 percent of those surveyed said the restoration of the Chesapeake Bay was "extremely important." However, in that same survey 75 percent reported that they "did not live in the watershed." Sadly, the survey was conducted within the watershed. This speaks to is the critical need for Federal programs such as No Child Left Inside and the National Park Service's Gateways and Captain John Smith Water Trail to raise awareness and constantly improve residents' understanding of their own watershed and what they can do to protect it. There are 17 million now residing in the watershed. To have 12 million not even aware of their place in the basin is a travesty that must be corrected.

Outlined above are some of the Chesapeake Bay Commission's highest priorities for the 111th Congress. However, I would be remiss if I did not recognize that the Bay restoration effort is and will always be defined by the sum of its parts – the many Federal agencies, the states, the local governments, NGO's and private sector. For this reason, the Commission has prepared a more comprehensive three year Congressional Agenda for 2008-2010 which describes the many constructive Federal actions that can be taken to authorize and reauthorize Federal programs to do much more. We ask that you give this Agenda your full consideration. We are also happy to work with staff on specific appropriations suggestions for FY 2010 and beyond.

Thank you for this opportunity to share our support with you today. My closing words should surely be, "Thank you, Senator Cardin."

The Chesapeake Bay Commission is a tri-state legislative commission, established in 1980 prior to the creation of the esapeake Bay Program, to advise the members of the general assemblies of Maryland, Virginia and Pennsylvania on matters of ywide concern. The catalyst for our creation was the Environmental Protection Agency's (EPA) landmark seven-year study (1976-83) on the decline of the Chesapeake Bay. Congressional concern prompted our beginnings and has since contributed handsomely our success.

The Commission is a partner in the Chesapeake Bay Program -- one of six signatories to the agreements that make up its dership. What makes the Commission unique is the simple fact that it is *not* an Executive Branch agency (like the other five rtners) and it is not of a single state. Instead, 21 members from three states, 15 of whom are legislators, provide a regional voice thin the Program.