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NUTRIENT TRADING AND WATER QUALITY

HEARING

BEFORE THE

SUBCOMMITTEE ON WATER AND WILDLIFE

OF THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED THIRTEENTH CONGRESS

FIRST SESSION

MAY 22, 2013

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C O N T E N T S

NUTRIENT TRADING AND WATER QUALITY

WEDNESDAY, MAY 22, 2013

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON WATER AND WILDLIFE,
Washington, DC.

The subcommittee met, pursuant to notice, at 2:30 p.m. in room 406, Dirksen Senate Building, Hon. Benjamin Cardin (chairman of the subcommittee) presiding.

Present: Senators Cardin, Vitter, and Boozman.

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

Senator CARDIN. Let me welcome you all to the Subcommittee on Water and Wildlife. I particularly want to thank Senator Boozman, the ranking Republican member of the Subcommittee, for his help in putting together today's hearing. The two of us had a conversation about how we thought it would be helpful to have an open discussion about nutrient trading, to learn more as to how it could be a useful tool to help clean up our waters, as well as provide certain incentives, particularly to farmers, to help us in meeting our environmental needs.

So with that in mind, we decided to have this hearing. We have two panels, and I want to thank all the panelists for their participation and being here. I am going to ask consent to put my full statement into the record. I will just summarize very briefly because I really want to get to the witnesses and to the discussion on nutrient trading and how it can work.

Nutrient pollution is well documented, its harm on our waters and our environment. We have had hearings in the Subcommittee on nutrient pollution. It comes from nitrogen and phosphorus and creates deadly algal blooms. We have dead zones that we know about throughout the globe.

It was interesting, the staff gave me the numbers which I find to be shocking. There are over 400 dead zones today, globally. But if you go back to 1995, there were about 305. So we have increased dramatically just in the last 15, 20 years. If you go back to 1980, there were 162 dead zones. And back to the 1960s, there were 49 dead zones. So we have seen an alarming increase in the number of dead zones caused by too much of the nitrogen and phosphorus pollutants going into our waters.

I am particularly aware of this, since one of the dead zones is the Chesapeake Bay, which I think the members of this committee have heard me talk about on more than one occasion, as to what

we need to do to help the Chesapeake Bay. We have been working on cleaning up the Chesapeake Bay in a formal way with cooperation among the various States, including the Federal Government, for now over 30 years. We have made tremendous progress in cleaning up the Chesapeake Bay.

But we still have tremendous work ahead of us. And the expansion of dead zones is one of the major problems that we have to deal with from the nutrients that are going into the Bay that are causing these dead zones. They come from farming, they come from storm runoff, they come from the way we handle our wastewater. All that produces nutrients that go into our waters. So we need to deal with all of those issues.

The largest single source is from farming. And it is one of the areas that has the greatest promise for reduction, because the cost issues associated with reducing nutrient pollution going into our waters from farming are manageable from the point of view of cost with some of the things that can be done. So what we are looking at is how we can make progress in reducing the nutrient levels in the most cost-efficient way. If farmers do more than is required, then they could have credits that could be sold in a nutrient trading program which seems to be a win-win situation. Less costly ways of dealing with pollutants, a revenue source for farmers, and we are all working together. Simple enough. I am sure there are more complications than that.

And that is the reason for this hearing. The reason is to learn from the experts how a nutrient trading program could be organized. I know States do have nutrient trading programs. But if you are talking about a multiple-State trading program, it gets more complicated. And how would that be done, how would we evaluate to make sure that indeed we are achieving the reductions that we think are right?. How are we dealing with the equity issues to make sure that we are not creating zones of pollution at the cost of other areas? How do we make sure that we have achieve our objectives in the most cost-effective way, do it in a fair way, and make sure that at the end of the day we really have served the public interest the way that we should?

We need a national discussion, my last point on this. States can do a limited amount, Maryland can be as aggressive in the Bay as any entity could be. But the Bay involves six States and the District of Columbia. You need to have the Federal guidelines on how we can work together on these large regional bodies of water, so that we can make the type of progress that we need.

With that, let me turn it over to Senator Boozman, then we will hear from our witnesses.

[The prepared statement of Senator Cardin follows:]

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

Good afternoon. Thank you to my colleagues and to our witnesses for your participation today. During the last Congress, this subcommittee held a hearing concerning nutrient pollution and the incredible harm it is inflicting upon our Nation's waterways. The goal of today's hearing is to explore the potential of market-based nutrient credit trading as a tool for addressing that pollution.

Nutrient pollution from nitrogen and phosphorus has consistently ranked as one of the top causes of degradation in some U.S. waters for more than a decade. It results in significant water quality problems including harmful algal blooms, hypoxia

(low oxygen levels), and declines in wildlife and wildlife habitat. These, in turn, harm the fishing, recreation, and service industries that are dependent on the health of those waterways. Nutrient pollution is a notable problem throughout the Nation, but it is particularly acute in the Chesapeake Bay.

Excess runoff and discharges of nutrients from farms, paved surfaces, wastewater treatment plants, and other sources are responsible for creating the excess algal growth that degrades water quality and harms the ecology of impacted water bodies. Algal growth in turn fosters aquatic dead zones, destroying fisheries and recreational waterways. There are more than 400 dead zones around the globe today, up from 305 in 1995, 162 in the 1980s, and just 49 in the 1960s. The Chesapeake Bay contains one of the most famous of these zones.

In the Bay, in the past two decades, the number of working oystermen has decreased 92 percent. Oystering once supported over 6,000 Maryland families. Today only 500 oystermen remain. This is just one example of not only the environmental, but also the economic devastation that nutrient pollution can cause.

Agricultural runoff represents the largest proportion of nutrient pollution and offers the greatest opportunity for achieving meaningful nutrient reduction through trading. Nutrient trading may provide a cost-effective market-based mechanism for accelerating water quality improvements. As such, it would also have the added benefit of incentivizing farmers to contribute actively toward water clean-up efforts.

With nutrient trading, entities that are able to reduce runoff of nutrients, such as nitrogen, below target levels are able to sell their surplus reductions as credits to entities facing higher nutrient reduction costs, reducing the overall nutrient load in the watershed. Today's hearing will help us to understand the extent to which ongoing nutrient trading programs are effective, and to explore the possible outlines of a Federal, interstate nutrient trading framework.

From our witnesses, we will seek information about what standards of measurement and verification must be in place for a nutrient trading scheme to be reliably effective and environmentally sound. Further, we will seek to understand how to build fairness into a nutrient trading system, and how to avoid unfairly burdening some communities with added pollution.

To these ends, we have invited two panels of witnesses to today's hearing. They will report on the functions of current State level nutrient trading programs, the authorities of the Government to create an interstate trading program, and the challenges of ensuring transparency and verifiability in any program of that sort.

On our first panel, Mr. Shapiro, Deputy Assistant Administrator of the Environmental Protection Agency Office of Water, will present the EPA's role in supporting current trading programs. He will also discuss the role of nutrient trading in an overall water quality improvement strategy. He will address what authorities or resources the EPA has or needs in order to create an interstate trading program or to expand trading to other watersheds. Mr. Shapiro will be able to give insight into what a federally managed interstate program might entail.

In the second panel, we will hear from several experts in the field about how an interstate nutrient trading program might be beneficial, and the challenges inherent in administering such a framework effectively. Our witnesses represent the perspectives of those involved in current nutrient trading programs, those who would be potential buyers of credits if an interstate market were to develop, and those who have concerns about the potential effectiveness of nutrient trading. We will also hear from an academic who has extensively studied market-based approaches to improving water quality.

The Water and Wildlife Subcommittee has a duty to ensure that the Nation's water quality laws are actually working and producing results. There is an ongoing debate about the appropriateness of the Federal role in nutrient reduction. Some argue that policing this runoff is an issue best left up to the States. Well, in Maryland, the State has spent $100 million a year over the past decade on nutrient reduction and improving the Bay. In spite of the State's concentrated efforts, the health of the Bay is still diminished.

The key to the Bay's restoration lies in recognizing that the Bay is merely the most obvious part of a much larger watershed. The Chesapeake Bay's watershed encompasses six States and the District of Columbia. Maryland's efforts alone cannot address runoff that originates across its borders. We must address the pollution in the Chesapeake by dealing with all the pollution in the entire watershed. This is a watershed-wide problem and the only real remedy lies in watershed-wide solutions. Thus, the State specific nutrient trading programs currently in existence may not be sufficient. A coordinated effort is necessary to restore this national treasure. The same is true of other water bodies across the Country, ranging from the Great Lakes to the Gulf of Mexico, and from Long Island Sound to San Francisco Bay.

Today's hearing will explore whether nutrient pollution can be mitigated by collaborative efforts and a coordinating role for Federal agencies. I want to thank our witnesses for joining us today to assist in our efforts to understand and assess the possibilities of nutrient trading programs.

OPENING STATEMENT OF HON. JOHN BOOZMAN, U.S. SENATOR FROM THE STATE OF ARKANSAS

Senator BOOZMAN. Thank you, Mr. Chairman. It really is an honor to serve with you on this Committee. We were visiting earlier, this is not the most glamorous work in the world, but it is so important. It really does affect so many of our constituents throughout America.

I appreciate your holding the hearing today on nutrient trading and water quality, and I do appreciate your efforts for us to work together on a bipartisan effort to try and address these very, very important problems. We were able to come together and reintroduce legislation to reauthorize the Water Resources Research Act last week. Our bill would continue support for water resources research institutes located at land grant universities in each State. The work at these institutes continues to be critical for our States that seek to implement nutrient trading and other innovative approaches to water quality and quantity challenges.

The Water Resources Research Act is one of the most effective Federal research programs when it comes to leveraging investment. Each Federal dollar must be matched with 2 dollars of non-Federal support. Back at home we have the Arkansas Water Resources Center at the University of Arkansas. Dr. Brian Haggard is the director, and he has performed a lot of work with one of today's witnesses, Dr. Marty Matlock.

Today I am eager to hear from each of our witnesses, but I very much look forward to Dr. Matlock's testimony. In our State, people across the political spectrum and diverse backgrounds know that Dr. Matlock is a go-to expert if you want a fair and impartial assessment of water quality challenges. I also want to thank Mr. Shapiro, Dr. McGee, Mr. Hawkins, and Ms. Bodine for being here today. I have known Susan for 12 years. When I served on the House and was on T&I, she was the staff director of the Water Resources and Environment Subcommittee, kept me straight. So again, we appreciate her being here, and I appreciate her expertise. Her knowledge and professionalism were well respected by members on both sides of the aisle. Again, I very much look forward to your testimony.

The topic of today's hearing, nutrient trading, is complicated, and it is interesting. Efforts over the last 20 years or so to promote nutrient trading have revealed both significant potential and serious pitfalls. On the upside, nutrient trading has the potential to help achieve reasonable water quality goals at the lowest possible cost. On the downside, landowners and point sources that have witnessed various EPA actions may be skeptical about the long-term benefits and costs of participating in nutrient trading programs. The lack of cooperative federalism between EPA and the States has created a spirit of distrust in many of our communities. Today, I believe that these distinguished witnesses may offer us insights on ways to promote cost-effective solutions to legitimate water quality concerns.

Finally, I want to acknowledge that Senator Inhofe can't be here today, but I know he has a very serious interest in this subject. So I ask unanimous consent that Senator Inhofe's statement be included in the record.

Senator CARDIN. Without objection, it will be included.

[The prepared statement of Senator Inhofe follows:]

STATEMENT OF HON. JAMES M. INHOFE,
U.S. SENATOR FROM THE STATE OF OKLAHOMA

As an avid sportsman and water enthusiast, water quality is of particular concern to me. And it is to Oklahoma as well.

Fortunately, Oklahoma is the leader in managing waterway nutrient content levels. The Oklahoma Water Resources Board, Oklahoma Department of Environmental Quality, and the Oklahoma Conservation Commission all work well together to pair conservation programs to reduce the number of impaired water bodies around the State.

Knowing how successfully Oklahoma has managed its waterways, I am always concerned that EPA is working to set a national standard for nutrient levels across the country. While no one will deny the fact that high nutrient levels can cause problems, establishing a one-size-fits all policy does not make any sense.

National standards may be appropriate for toxic substances, but nitrogen and phosphorus are naturally occurring in widely varied concentrations. They are necessary components of healthy ecosystems, and different ecosystems will be healthy with different water nutrient levels. A fair comparison is the caloric intake of different people. My grandsons who play football and tennis should have a higher caloric intake than I do; it would be silly to set a caloric intake standard that is the same for both of us. Similarly, a single number for nitrogen or phosphorus levels is not often an accurate indicator the health of the ecological or the water's quality.

A national standard for nutrient levels in water bodies could be a disaster if applied in Oklahoma. States should be making decisions about appropriate standards. In Oklahoma, having this discretion is of utmost importance because our State is so diverse. With so many lakes, we have more shoreline than any other State in the country; but the western part of our State is relatively dry, and the eastern part of our State gets a lot of rainfall. The soil changes as you move across the State, and the land uses do as well. All of these things impact nutrient levels in Oklahoma's waterways. Knowing this, even having a nationally mandated State-wide standard would be inappropriate. Each waterway is unique, and the State of Oklahoma has proven that it is well equipped to consider different waterway factors like biology, sunlight, optimal stream substrate, stream flow, temperature, and background water chemistry to determine appropriate nutrient levels and then use conservation programs to manage any pollution problems that exist.

These efforts have resulted in nutrient loading reductions of between 60 percent and 70 percent in Oklahoma's highest priority watersheds. Many waters have been taken off of the 303(d) list of impaired waters, and we've been ranked as one of the top five States in the Nation for estimated nutrient load reductions due to the implementation of the Clean Water Act's 319 program. In addition, Oklahoma has established numeric nutrient criteria for some waterbodies since it was the best approach to address nutrient loading in those specific instances. It is this combination of approaches that makes Oklahoma successful in addressing nutrients.

EPA's decisions to reduce funding for programs that actually work—like the 319 program and the SRF—in exchange for increased funding for global warming activities, have put a strain on Oklahoma's ability to expand on the good conservation work that has already been done.

Nutrient reduction credit trading may be an innovative and helpful program to help large metropolitan areas with significant point source polluters address their problems; while there has been some interest in this concept in Oklahoma, again, one size does not fit all and it is not applicable or workable in all instances. To my knowledge, there is nothing preventing any State from setting up this kind of arrangement should it so choose.

But to the extent that we are talking about expanding this type of proposal, we need to take it one step at a time, not rush to judgment, and certainly should not use it as an opportunity to impose any national nutrient standards or even force the States to establish and maintain State-wide standards.

As I said before, I strongly believe that States should be in the driver's seat when it comes to considering the nutrient levels of their waterways. But States should not

be forced to impose certain standards, nor should they be required to implement credit trading schemes if they will not serve the interest of the State.

I thank the Chair for allowing the opportunity to make opening statements, and I look forward to hearing from the panel.

Senator BOOZMAN. His schedule, as we all know, has been severely interrupted by the devastation in Oklahoma. I know that our thoughts and prayers are with those people that have suffered such a tragedy.

On that somber note, again, I want to thank the Chairman and say that I look forward to our witnesses' testimony today. I yield back.

Senator CARDIN. Senator Boozman, thank you very much. Our prayers and thoughts are with the people of Oklahoma. As many of us have already said, we are going to do everything we can to help as a Federal partner in that regard.

Senator Vitter.

OPENING STATEMENT OF HON. DAVID VITTER, U.S. SENATOR FROM THE STATE OF LOUISIANA

Senator VITTER. Thank you, Mr. Chairman. I thank you and the Ranking Member of the Subcommittee for this important hearing. I will submit my full opening statement for the record as well as some questions.

I just want to underscore what the Ranking Member said. This is a pretty new idea. It could offer some potential and benefits. But I fully understand if the ag community in particular is skeptical. There has been a real attack on ag producers by the EPA in many regards. Most recently with the Agency's release of personal and confidential business information of certain operations, and a litany of regulations in an effort to expand the Agency's jurisdiction.

So there is a high level of distrust. Given that, I think we need to fully vet any ideas like this, because there is that natural skepticism. But I want to learn more, and thank you for the hearing.

Senator CARDIN. Without objection, your statement will be made part of the record.

[The prepared statement of Senator Vitter follows:]

STATEMENT OF HON. DAVID VITTER,
U.S. SENATOR FROM THE STATE OF LOUISIANA

Mr. Chairman, I would like to thank you for calling today's hearing. I would also like to thank our witnesses for testifying before us this afternoon.

Today, we are here to discuss whether nutrient trading can be a cost-efficient mechanism to help meet water quality goals.

In theory, nutrient trading has the potential to provide point sources with the flexibility needed to achieve water quality goals in a more cost-efficient manner, while at the same time providing incentives to nonpoint sources to reduce their pollution loads. The emphasis on potential savings is important.

While I support the overall goal of reducing costs associated with meeting water quality goals, nutrient trading is a relatively new idea and more information is needed to assess the effectiveness of these programs. In practice, programs tend to work differently than in theory and we need to make sure that we fully understand the risks and rewards before moving forward. This is why we are here today.

The potential benefits from nutrient trading programs can only be realized if programs are appropriately structured and implemented. Regulators should not impose rigorous standards at the outset that would discourage or inhibit States and communities from pursuing nutrient trading options. Rather than a "one-size-fits-all" Federal approach, States should be given sufficient time and flexibility to develop these programs and to figure out what works best for local communities.

I can fully understand if the agricultural community is skeptical. There has been a consistent attack on our agricultural producers by the U.S. Environmental Protection Agency (EPA), most recently with the Agency's release of personal and confidential business information relating to concentrated animal feeding operations (CAFOs). A litany of regulations and an effort to expand the Agency's jurisdiction under the Clean Water Act have all led to distrust of our Federal agencies, and in particular the EPA.

I look forward to today's discussion and learning more about how we might address the scientific and practical obstacles involved in implementing successful nutrient trading programs.

Senator CARDIN. With that, let me turn to Michael Shapiro, the Deputy Assistant Administrator for the Office of Water, United States Environmental Protection Agency. Mr. Shapiro, thank you very much for your public service, and thank you for being here.

STATEMENT OF MICHAEL H. SHAPIRO, DEPUTY ASSISTANT ADMINISTRATOR, OFFICE OF WATER, U.S. ENVIRONMENTAL PROTECTION AGENCY

Mr. SHAPIRO. Thank you. Good afternoon, Chairman Cardin, Ranking Member Boozman and Senator Vitter.

I am pleased to be here today to discuss water quality challenges posed by nutrient pollution and the promise that water quality trading tools hold for helping to reduce nutrient pollution in a more flexible and cost-effective way.

I have submitted my full statement for the record, and I will summarize it here.

As you noted, Senator Cardin, nutrient pollution caused by elevated levels of nitrogen and phosphorus is a major threat to clean water. It has been extensively documented in the scientific literature and confirmed by monitoring data collected at the Federal, State and local levels. States have identified more than 15,000 waters nationwide that have been degraded by excess levels of nutrients. An increasingly troubling result of nutrient pollution is the proliferation of harmful algal blooms, where waters are choked with algae that produce toxins, that threaten public health, aquatic life, food sources and drinking water quality.

In general, the primary sources of nitrogen and phosphorus pollution in urban and suburban areas are stormwater runoff and municipal wastewater treatment systems. In rural areas, in towns and cities continue to be an important contributor, but the predominant sources are waste from agricultural livestock activities and excess fertilizer from row crops.

EPA recognizes the Nation's significant nutrient pollution challenge and is committed to finding collaborative solutions that protect and restore our waters and the health of the communities that depend on them. To reaffirm EPA's commitment to partner with States and collaborate with stakeholders to reduce nitrogen and phosphorus loadings to the Nation's waters, Acting Assistant Administrator Nancy Stoner sent a memorandum to EPA's 10 regional offices in March 2011. The memo lays out a framework for guiding EPA's work with States and stakeholders to achieve nutrient reductions.

EPA recognizes that States need room to innovative and respond to local water quality needs and that one-size-fits-all solutions to nitrogen and phosphorus pollution are neither desirable nor necessary.

An approach with significant potential to help reduce nutrient pollution is water quality trading. EPA has promoted and supported the concept of water quality trading as an innovative approach for achieving water quality standards with flexibility and economic efficiency. Water quality trading allows one source to meet its regulatory obligations by using pollutant reductions created by another source that has lower pollution control costs.

In 2003, EPA published a water quality trading policy which sets the stage for our State partners to include trading as a flexible compliance pathway for Clean Water Act permitted sources. As outlined in the policy, EPA believes that water quality trading and other market-based programs should be consistent with the Clean Water Act; that water quality trading should occur within a watershed or a defined area for a total maximum daily load, or TMDL, where such has been approved; that nutrients and sediments are pollutants most amenable to trading; and that the baselines for generating pollution reduction credits should be derived from and consistent with water quality standards established by the States or tribes under the Clean Water Act.

The trading policy supports trading among point sources, such as municipal wastewater treatment plants, industrial facilities and municipalities covered by stormwater permits, as well as between point sources and non-point sources, such as farmers and other landowners. In the latter circumstances, EPA believes that it is important that these non-point sources have clear baselines for pollution contributions, such as what would be allocated under a TMDL, and that the pollution reductions that take place are clearly measured and documented.

In addition to the Agency's 2003 trading policy, the EPA has developed a toolkit for water quality trading that can help identify possible approaches that States, the regulated community and other sources can use to encourage water quality trading. In addition, the EPA has supported States' trading efforts through grants. We have held workshops on water quality trading and offer online training for States, tribes and other interested parties. The EPA is also working closely with the Department of Agriculture to help agricultural producers participate in trading programs.

Water quality trading programs are in various stages of implementation across the Country. There are a few very noteworthy cases, such as the Connecticut example, where 79 municipal wastewater plants trade among themselves to meet nitrogen reduction targets for the Long Island Sound. There are other programs that have been developing within the Chesapeake Bay. All of the States that contribute to the Bay and are covered by the TMDL are planning to use offsets, which is a form of trading, to deal with new growth. And several have developed trading programs that are designed to assist point sources and allow both point to point as well as point to non-point source trades.

This concludes my statement. I will be happy to answer any questions you might have.

[The prepared statement of Mr. Shapiro follows:]

TESTIMONY OF

MICHAEL H. SHAPIRO
PRINCIPAL DEPUTY ASSISTANT ADMINISTRATOR FOR WATER
U.S. ENVIRONMENTAL PROTECTION AGENCY

BEFORE THE
SUBCOMMITTEE ON WATER AND WILDLIFE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

May 22, 2013

Good afternoon Chairman Cardin, Ranking Member Boozman, and Members of the Subcommittee. I am pleased to appear before you today to discuss the water quality challenges posed by nutrient pollution and the promise that water quality trading holds for helping reduce nutrient pollution in more flexible and cost-effective ways. More specifically, my testimony today will outline the extent of our nation's nutrient pollution problem, identify opportunities for reducing nutrient pollution, describe EPA's policy on water quality trading, share examples of successful trading efforts, and detail several actions the EPA has taken to encourage trading to occur.

Our Nation's Nutrient Pollution Problem

Nutrient pollution – caused by elevated levels of nitrogen and phosphorus -- is a major threat to clean water. This has been extensively documented in the scientific literature and confirmed by monitoring data collected at federal, state, and local levels. States have identified more than 15,000 waters nationwide that have been degraded by excess levels of nutrients to the point that they do not meet state water quality standards. The EPA's most recent National Aquatic

Resource Surveys of aquatic health found that of the stressors assessed, nitrogen and phosphorus are the most pervasive in the Nation's small streams and lakes. Approximately 50 percent of streams and more than 40 percent of lake acres have high or medium levels of nutrients.

Contamination of coastal waters by nutrient pollution is also a widespread and growing problem. For example, a recent analysis of 647 U.S. coastal and estuarine ecosystems indicates that the percentage of systems with low oxygen levels or hypoxia (a common result of high nutrient levels) has increased dramatically since the 1960s and has become measurably worse even since the 1980s. The first national assessment of oxygen conditions in U.S. waters, conducted in the 1980s, found 38 percent of systems to have hypoxia. Updating the information using today's data finds that 307 of 647 ecosystems, or 47 percent, experience hypoxic conditions. Severe hypoxia can result in "dead zones," an occurrence that unfortunately is occurring in increasing scope and magnitude in many of the Nation's coastal waters. An increasingly widespread and persistent result of nutrient pollution is the proliferation of harmful algal blooms – a situation in which waters are choked with algae that produce toxins that threaten public health, aquatic life, food sources, and drinking water quality.

The sources of nitrogen and phosphorus pollution to a waterbody vary depending on activities surrounding and upstream of a particular waterbody. In general, nitrogen and phosphorus pollution in urban and suburban areas enter our waters from stormwater runoff and discharges from municipal wastewater treatment systems. In rural areas, stormwater runoff and discharges from municipal wastewater treatment systems can also be important contributors, but in these areas we find that waste from agricultural livestock activities and excess fertilizer from row crops can be more important contributors to nitrogen and phosphorus pollution to a waterbody.

Actions to Address the Nutrient Pollution Problem

The EPA and its State partners recognize the nation's significant nutrient pollution challenges. EPA is committed to finding collaborative solutions that protect and restore our waters and the health of the communities that depend on them. The growing and costly impacts of nutrient pollution on human health, recreation, tourism, business growth and expansion, and aquatic ecosystems demand a strengthened and far more coordinated framework of action if we are to succeed in the urgently needed job of reducing nitrogen and phosphorus loadings to our nation's waters.

To reaffirm the EPA's commitment to partner with states and collaborate with stakeholders to reduce nitrogen and phosphorus loadings to the Nation's waters, Acting Assistant Administrator Nancy Stoner sent direction to the EPA's ten Regional offices in March 2011. The memo, entitled *Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions*, lays out a framework for guiding the EPA's work with states and stakeholders to achieve nutrient reductions. The EPA recognizes that states need room to innovate and respond to local water quality needs, and that a one-size-fits-all solution to nitrogen and phosphorus pollution is neither desirable nor necessary.

This recommended nutrient reduction framework encourages states to set priorities for nutrient reductions and to take action to reduce nutrient loadings to their waters while work continues at the State level to develop numeric nutrient criteria in State Water Quality Standards where needed. The EPA has worked with states across the country to help them develop numeric nutrient criteria and EPA supports State efforts to set priorities and achieve near term load reductions to achieve our common goals. Nutrient reductions for point sources of pollution

can be achieved through National Pollutant Discharge Elimination System (NPDES) permits, which can be written to include permit limits that result in reduced nutrient discharges to affected waterbodies and therefore healthier waters.

For discharges to waters that states have determined are impaired as a result of nutrient pollution, Total Maximum Daily Loads (TMDLs) provide loading limits for point and non-point sources that, when implemented, will achieve water quality standards.

EPA's Trading Policy and Toolkit

An approach with significant potential to help reduce nutrient pollution – and the focus of today's hearing – is water quality trading. The EPA has for many years encouraged and supported the concept of water quality trading as an innovative approach for achieving water quality standards with flexibility and economic efficiency. Water quality trading allows one source to meet its regulatory obligations by using pollutant reductions created by another source that has lower pollution control costs. Trading capitalizes on economies of scale and the control cost differentials among and between sources. Sources that achieve greater-than-required nutrient reductions can generate "credits" that can be traded to other sources that cannot as easily, or cost-effectively, reduce nutrient loadings. Trading can occur between point sources, or between point and non-point sources, which are then usually implemented through enforceable state or federally issued permits. This approach works best in situations where there are multiple upstream sources of pollution that contribute to the impairment of a downstream waterbody, such as a large river, lake, bay, or coastal water. Under these circumstances, reducing pollutant loads in the downstream water could be achieved by reducing the pollution generated by upstream sources.

In 2003, the EPA published a Water Quality Trading Policy, which encouraged our state partners to include trading as a flexible compliance pathway for CWA-permitted entities.[1] As outlined in the Policy, the EPA reaffirmed its support for state implementation of water quality trading by states, interstate agencies, and tribes where trading:

- Achieves early reductions and progress towards water quality standards pending development of Total Maximum Daily Loads (TMDLs) established under the CWA for impaired waters;
- Reduces the cost of implementing TMDLs through greater efficiency and flexible approaches;
- Establishes economic incentives for voluntary pollutant reductions from point and nonpoint sources within a watershed;
- Reduces the cost of compliance with water quality-based requirements;
- Offsets new or increased discharges resulting from growth in order to maintain levels of water quality that support all designated uses;
- Achieves greater environmental benefits than those under existing regulatory programs;
- Secures long-term improvements in water quality through the purchase and retirement of credits by any entity; and/or
- Combines ecological services to achieve multiple environmental and economic benefits, such as wetland restoration or the implementation of management practices that improve water quality and habitat.

[1] This Policy is available at http://water.epa.gov/type/watersheds/trading/finalpolicy2003.cfm.

As outlined in the Policy, (1) water quality trading and other market-based programs should be consistent with the CWA, (2) water quality trading should occur within a watershed or a defined area for which a TMDL has been approved, (3) EPA believes that nutrients and sediment are the pollutants most amenable to trading, and (4) the baselines for generating pollution reduction credits should be derived from and consistent with water quality standards established by states or tribes under the CWA. EPA's policy does not support trading where it would harm local water quality. Trading programs should provide all communities and persons the same degree of protection from environmental and health hazards.

Under the CWA, typically only the holders of NPDES permits – known as "point sources" – are required to meet pollution limits. These permit-holders are required to control nutrient pollution if their permits require such limitations. For nutrients, such point sources can include wastewater treatment plants, industrial facilities, and municipalities covered by stormwater permits, and certain large animal agriculture operations defined as Confined Animal Feeding Operations (CAFOs). Diffuse runoff from sources such as agricultural fields – known as "non-point sources" – are generally not subject to these requirements applicable to point sources, but some states may impose controls on these sources. However, "pound-for-pound", they may be able to achieve reduced nutrient pollution loads to a waterbody less expensively than what would be required of the point sources. In these cases, non-point sources may be good candidates to undertake nutrient pollution reduction projects and then sell the credits generated by these efforts to point sources. In these circumstances, the EPA believes that it is important that these non-point sources have a clear "baseline" for their pollution contributions (such as a defined load allocation in a TMDL or other appropriate baseline), and that the pollution

reductions that take place are clearly measured and documented. Point sources, as well, can generate credits for sale.

In addition to the agency's 2003 trading policy, the EPA has developed a toolkit for water quality trading that can help identify possible approaches that states, the regulated community, and other sources can use to encourage water quality trading.[2] This toolkit helps to clarify the EPA's expectations for water quality trading programs in order to reduce uncertainty and to provide the tools states need to set up their own trading programs. The EPA has supported states' trading efforts through grants, such as a 2009 grant for efforts in the Mississippi River Basin. The EPA has also held workshops on water quality trading, including a workshop in November 2012, and offers online training for states, tribes, and other interested parties on water quality trading. In the Chesapeake Bay Region, as a result of the comprehensive TMDL that was established in December 2010, EPA is working closely with several states as they develop or expand their trading programs to more efficiently achieve their nutrient reduction goals.

Implementing Water Quality Trading

The CWA provides critical, front-line roles for authorized states and tribes to implement the day-to-day programs that protect and maintain the physical, chemical, and biological integrity of the nation's waters. The states take the lead (with oversight by EPA) in setting water quality standards for their waters and developing and implementing TMDLs to achieve those standards. For the 46 states and one territory authorized to implement the CWA's NPDES permitting program, the states also take the lead in writing permits to achieve those standards. In

[2] The EPA's Water Quality Trading Toolkit for Permit Writers is available at http://water.epa.gov/type/watersheds/trading/WQTToolkit.cfm.

the same way, states have the lead in establishing and administering water quality trading programs for their waters.

Water quality trading programs are in various stages of implementation across the country. Some examples of progress toward implementing trading include the following:

- EPA serves as the NPDES permitting authority in only four states (and Washington DC), one of which is Idaho. In anticipation of a phosphorus TMDL for the Lower Boise River, the EPA worked with the state environmental agency and watershed stakeholders to develop a water quality trading framework that would be implemented once the TMDL was approved. That TMDL is now being developed and will support the use of water quality trading as a tool to meet the new phosphorus limits at lower cost to the point sources.
- Connecticut's Long Island Sound Nitrogen Credit Exchange Program, established in 2002, is responsible for the largest number of water quality trades. The program has nearly achieved its 2014 nitrogen reduction goal by facilitating trading across 79 municipal wastewater plants within Connecticut that drain into Long Island Sound. According to the Program's 2010 progress report, 15.5 million nitrogen credits have been traded. Connecticut's program only involves permitted point sources – not non-point sources such as landowners.
- In 2005, Virginia launched a nutrient trading program for the rivers that drain into the Chesapeake Bay. In Virginia's program, permitted municipal point sources within each river basin may trade with each other, initially without including landowners. Once the point sources can no longer collectively satisfy their river-specific nutrient goals, they may then begin to purchase credits from landowners. Additionally, all

new nutrient loads, including those resulting from development, must be offset. Virginia law allows for off-site nutrient credits to be used to compensate for the increased loads. To do so, new dischargers must purchase such credits from willing landowners with permanent nutrient reductions as defined by the Commonwealth. A private nutrient banking industry is beginning to form in Virginia as a result of this opportunity.

The EPA supports state flexibility in designing nutrient trading programs that are consistent with the CWA and that effectively and efficiently achieve water quality results for each state. Some states, for example, choose to include non-point sources in their trading programs (such as Virginia), while some have not (such as Connecticut). Some trades take place in impaired waters after a TMDL has been established, while others occur in impaired waters prior to TMDL development. Where NPDES permit-holders have water-quality based effluent limits for nutrients, there may be incentives to pursue water quality trading to achieve nutrient reductions in the most cost-effective way, while remaining consistent with CWA requirements. In the Chesapeake Bay, for example, states and permit-holders have clear pollutant reduction goals established by their allocations in the Bay TMDL and the Bay jurisdictions' watershed implementation plans. The Bay TMDL's waste-load allocations are implemented through NPDES permits and, therefore, NPDES dischargers with nutrient permit limits may have reason to pursue trading approaches that achieve those goals more efficiently. The EPA also believes that interstate trading can be an effective tool for achieving pollution reductions among states, and is interested to work with interested states to pursue such approaches and to ensure that they are consistent with the CWA.

The EPA provides a number of tools to help agricultural producers participate in trading programs, many of which are implemented in collaboration with the U.S. Department of Agriculture (USDA). At the national level, the agencies signed a Memorandum of Agreement in 2006 on water quality trading that helps guides the agencies' collaborative efforts. In 2012, USDA awarded Conservation Innovation Grants specifically focused on supporting water quality trading, and the EPA worked closely with USDA to support its efforts. The 2010 Strategy for Protecting and Restoring the Chesapeake Bay Watershed calls for USDA to be the lead agency, in collaboration with the EPA and other federal agencies, to help create environmental markets within the Chesapeake Bay watershed. The EPA looks forward to continuing its close collaboration with USDA, agricultural producers, states, and other stakeholders to encourage these trading efforts.

Conclusion

The threat posed by nutrients in the Nation's waters is one of the most serious water pollution problems faced by the EPA, the states, and local communities. As I have outlined, the EPA continues to support water quality trading as a tool for meeting CWA requirements in a more flexible and cost-effective way. The EPA is committed to working with our state, federal, and tribal partners, as well as farmers, businesses, communities, and other stakeholders, to identify ways to tackle nutrient pollution problem in a way that protects and restores waters, sustains the economy, and safeguards the well-being of all Americans who depend upon clean and safe water.

Thank you for the opportunity to testify before the Subcommittee today. I look forward to answering any questions you may have.

EPA Responses to Follow-Up Questions for Written Submission
Subcommittee on Water and Wildlife
Senate Committee on Environment and Public Works
Hearing: "Nutrient Trading and Water Quality," May 22, 2013

Senator Benjamin Cardin

1. Is it accurate that multiple independent entities as well as previous Administrations have all highlighted the benefits of using numeric nutrient criteria? Why have these entities recommended the use of numeric criteria?

Response: In 2009, the State-EPA Nutrient Innovations Task Group published a report, "An Urgent Call to Action: Report of the State-EPA Nutrient Innovations Task Group," that focused on drawing attention to the need for nutrient reduction strategies including the importance of numeric nutrient criteria. This report noted that the issue of excess nutrients has been studied and documented extensively and that there have been numerous major reports, a substantially large number of national and international scientific studies, and a growing number of quantitative analyses and surveys at the state and national levels highlighting the pervasive and growing problems caused by excess levels of nitrogen and phosphorus in our nation's waters. The report lists a number of examples of key reports on nutrient pollution from various sources, including the EPA's Science Advisory Board, the National Academy of Sciences' National Research Council, and the National Oceanic and Atmospheric Administration. The U.S. Geological Survey, in seeking advice on which contaminants were most important to focus on in developing its National Water-Quality Assessment Program, obtained almost unanimous agreement that nutrients were a widespread and longstanding issue.

As part of a nutrient reduction strategy, numeric nutrient water quality standards create clear environmental baselines, as compared to narrative standards, and provide for more effective watershed protection management by allowing more efficient development of Total Maximum Daily Loads and protective National Pollutant Discharge Elimination System (NPDES) permits limits, to provide quantitative targets to support trading, to evaluate the success of nonpoint source reduction programs, and to measure environmental progress. The EPA's support for numeric standards has been expressed on several occasions. The first was a June 1998 National Strategy for Development of Regional Nutrient Criteria issued under the Clinton Administration. Under the Bush Administration, a November 2001 national action plan was issued for the development and establishment of numeric nutrient criteria. Then, in 2007, the EPA reaffirmed the need for the states to adopt numeric nutrient criteria and for the EPA to assist states, territories and authorized tribes with that effort, and provided a national update on the development of numeric nutrient water quality standards and the need for accelerating the pace of progress. In 2008, the EPA published "State Adoption of Numeric Nutrient Standards 1998–2008," the first national report on progress made by the states in adopting numeric nutrient water quality standards.

Under the Obama Administration, the EPA reemphasized the urgency of nitrogen and phosphorus pollution by forming the State-EPA Nutrient Innovations Task Group (NITG) in

2009 to focus on reducing nitrogen and phosphorus pollution in U.S. waters. And most recently, in 2011, the EPA published a memorandum reaffirming its commitment to partnering with states and stakeholders to address nitrogen and phosphorus pollution. Both documents reiterate the notion that numeric nutrient criteria are ultimately necessary for effective nutrient control programs, while reinforcing the need for effective partnerships between the EPA, states, and other stakeholders.

2. Does the use of numeric nutrient criteria imply the use of a single nation-wide or state-wide standard? Can numeric nutrient criteria be used in a flexible manner that adapts to local conditions?

Response: The EPA believes numeric nutrient criteria can be developed and used in a flexible manner that adapts to local conditions. The EPA does not believe that a single nation-wide or state-wide numeric nutrient criteria value would be appropriate or scientifically sound. In fact, as part of its 1998 nutrient criteria strategy, the EPA committed to develop recommended regionally-based numeric nutrient criteria that reflect geographic variation and waterbody types.

The EPA fulfilled the commitments made in the 1998 strategy, and in 2000-2001 published technical guidance for developing numeric nutrient criteria for lakes and reservoirs; rivers, streams and estuaries; and for coastal waters, and the agency also published a series of recommended criteria values for 12 ecoregions for lakes and reservoirs, 13 ecoregions for rivers and streams, and one ecoregion for wetlands. In 2007, the EPA also published technical guidance for developing numeric nutrient criteria for wetlands. The agency expected states to use these waterbody type guidance manuals and recommended numeric nutrient target values as a guide in deriving and adopting numeric nutrient water quality criteria into state standards.

The EPA has always maintained that states could develop nutrient criteria that protect specific designated uses by utilizing the process outlined in the guidance manuals, by adopting EPA's recommended numeric nutrient criteria, or by using other scientifically defensible methods and appropriate water quality data. The EPA encourages states to accelerate their efforts and give priority to adopting numeric nutrient water quality standards or numeric translators for all waters that contribute nutrient loadings to our nation's waterways, but believes that states should determine how best to prioritize their waters. The EPA has also provided direct technical support to states for the development of numeric nutrient criteria.

3. Can EPA play a constructive role, in consultation with the states, in helping to establish new water quality trading markets? Can you describe the types of assistance that EPA can provide to States in establishing and managing water quality trading programs?

Response: Yes, the EPA believes that it can play an important role in providing technical assistance and other support to states that are designing and implementing trading programs. The EPA continues to support water quality trading as a tool for meeting CWA requirements in a more flexible and cost-effective way, and believes that its Water Quality Trading Policy and Water Quality Trading Toolkit for Permit Writers can help guide states in developing trading programs consistent with the CWA. The EPA will continue to review newly proposed trading programs for consistency with CWA requirements, review draft state NPDES permits that

incorporate trading, provide training, participate in state and stakeholder-sponsored workgroups when invited, and otherwise support states in developing trading programs.

Senator David Vitter

1. In your written testimony you indicate that EPA is "committed to finding collaborative solutions that protect and restore our waters and the health of the communities that depend on them." You also state that EPA "recognizes that states need room to innovate and respond to local water quality needs, and that a one-size-fits-all solution to nitrogen and phosphorous pollution is neither desirable nor necessary."

I think this emphasis on collaboration and state innovation is helpful, and I appreciate EPA's recognition that there is not one single solution to the issue of nutrient pollution. Based on your testimony, is it fair to say that EPA's role in nutrient trading will be to assist state trading efforts, and that EPA will not be in the business of mandating certain standards or regulatory schemes for nutrient trading?

Response: Yes, the EPA will continue to assist states as they pursue water quality trading programs. The EPA has no current plans to mandate nationally how nutrient trading programs must operate. A key principle in trading programs is ensuring that such programs are consistent with the Clean Water Act. For that reason, the EPA will continue to work with states to ensure that their trading programs are consistent with the Act. The EPA believes that the agency's 2003 Water Quality Trading Policy and 2007 Water Quality Trading Toolkit for Permit Writers, both available at www.epa.gov/waterqualitytrading, provide helpful guidance to states on ensuring that trading programs are consistent with the Clean Water Act. We also look forward to continuing to work with states in the context of the EPA's ongoing NPDES oversight role to ensure that individual trades embodied in NPDES permits are also consistent with the Act.

2. EPA has a 2003 Trading Policy, as well as a Water Quality Trading Toolkit. These documents seem helpful, but my concern is that EPA may at some point move from a Toolkit to a rule or regulation that would give the states little to no flexibility on nutrient trading. Can you assure me that EPA's input on nutrient trading will maintain a suggestive tone and not come in the form of heavy-handed regulations?

Response: The EPA has no current plans to promulgate national rules specific to water quality trading.

3. We understand and support EPA's opposition to "one-size-fits-all" water quality policy, especially in regard to limiting and reducing nutrient levels in U.S. waterways. Unfortunately, this "one-size-fits-all approach" is precisely what is being advocated, in effect, by many environmental groups. For example, in 2008, various environmental groups submitted a rulemaking petition for your agency to establish nutrient water quality standards and Total Maximum Daily Loads (TMDLs) to control nitrogen and phosphorous "for all water bodies in all states," a demand that completely contradicts the notion of state innovation and the principle of state primacy in setting water quality standards established by the Clean Water Act. Fortunately, you denied the petition, although I understand that

the environmental groups have continued their overreaching demands-- at least in regard to Mississippi River basin states-- through costly litigation in my home state of Louisiana (Gulf Restoration Network v. US EPA, No. 2: 12-cv-677 [EPA's motion to dismiss and motion for summary judgment pending]). I would like to thank you for opposing these unhelpful environmentalist demands. Can you comment on EPA's opposition to these demands for EPA to impose sweeping nutrient criteria on Mississippi River basin states, and how these demands impact EPA's policy of using multiple, flexible approaches -- including nutrient trading -- to address nutrient issues?

Response: The EPA believes that the most effective and sustainable way to address widespread and pervasive nutrient pollution in the Mississippi-Atchafalaya River Basin (MARB) and elsewhere is to work cooperatively with states and tribes to strengthen their nutrient management programs. This approach, in the agency's judgment, is preferable to undertaking a rulemaking to promulgate federal numeric nutrient criteria, or developing a Total Maximum Daily Load, for all MARB states. The EPA's March 16, 2011 memorandum, "Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions," reaffirms the EPA's commitment to partnering with states and collaborating with stakeholders to make greater progress in accelerating the reduction of nitrogen and phosphorus loadings to our nation's waters. The memorandum synthesizes key principles that are guiding and have guided agency technical assistance and collaboration with states and urges the EPA Regions to place new emphasis on working with states to achieve near-term reductions in nutrient loadings.

The EPA believes that states, the EPA, and stakeholders, working in partnership, must make greater progress in accelerating the reduction of nitrogen and phosphorus loadings to our nation's waters. While the EPA has a number of regulatory tools at its disposal, our resources can best be employed by catalyzing and supporting action by states to protect their waters from nitrogen and phosphorus pollution. The EPA can most effectively encourage progress through on-the-ground technical assistance and dialogue with state officials and stakeholders, coupled with cooperative efforts with agencies like the U.S. Department of Agriculture (USDA) that have expertise and financial resources to spur improvement in best practices by agriculture and other important sectors.

States need room to innovate and respond to local water quality needs, so a one-size-fits-all solution to nitrogen and phosphorus pollution is neither desirable nor necessary. Nonetheless, our prior work with states points toward a framework of key elements that state programs should incorporate to maximize progress. The EPA's discussions with states have focused on tailoring the framework to particular state circumstances, taking into account existing tools and innovative approaches, available resources, and the need to engage all sectors and parties in order to achieve effective and sustained progress. Our experience in over 40 years of Clean Water Act implementation demonstrates that motivated states, using tools available under federal and state law and relying on good science and local expertise, can mobilize local governments and stakeholders to achieve significant results.

4. Are there any other recent examples where environmental groups have actually impeded nutrient pollution reduction?

Response: The EPA is unaware of any recent examples in which environmental groups have prevented or impeded nutrient pollution reductions.

5. You state in your written testimony that "[t]rading can occur between point sources, or between point and nonpoint sources." Can you elaborate on how trading between point and nonpoint sources might work and whether it is a realistic way to achieve nutrient pollution reduction?

Response: The EPA believes that trading between point and nonpoint sources can be a realistic way to achieve nutrient pollution reductions. A critical issue for ensuring effective trading between point and nonpoint sources is ensuring that pollutant load reductions from nonpoint sources are adequately documented. The EPA's 2007 Water Quality Trading Toolkit for Permit Writers includes a section devoted specifically to point-to-nonpoint-source trading and helps explain how nonpoint sources can document their pollutant reductions. For example, the document describes how, in some cases, nonpoint source pollutant load reductions can be measured directly. In cases where such load reductions cannot be measured directly, the EPA recommends that state programs use the best-available performance information to estimate load reductions of a particular best management practice (BMP), and then discount these estimated values using uncertainty ratios to account for the technical challenges in determining BMP effectiveness.

Using such approaches, trading between point and nonpoint sources has been successfully implemented in Pennsylvania and Oregon, for example, for nutrient and temperature trading, respectively.

6. You have also indicated that "water quality trading should occur within a watershed or a defined area for which a [Total Maximum Daily Load] has been approved" under Section 303 of the Clean Water Act. Once EPA has approved a TMDL, and assuming a state decides to implement the TMDL through a trading program, what authority does EPA have to decline or disapprove of the state's implementation plan?

Response: While the EPA encourages states to develop and implement plans to achieve TMDL targets, as it did in connection with the 2010 Chesapeake Bay TMDL, the EPA does not approve or disapprove such plans when it approves or disapproves TMDLs. *Sierra Club v. Meiburg* (2002) and *Amigos Bravos v. Green* (2004) distinguish between TMDLs and their implementation plans. The *Meiburg* court noted the difference as follows: "A TMDL is defined to be a set measure or prescribed maximum quantity of a particular pollutant in a waterbody . . . while an implementation plan is a formal statement of how the level of that pollutant can and will be brought down to or kept under the TMDL." The court in *Amigos Bravos* said there "is no statutory language requiring submission to or approval of a State's implementation plan by the EPA; rather, the statute only required that the EPA approve or disapprove a State's TMDL." As the *Meiburg* court noted, "The responsibility for implementing the TMDLs once they were established was left to [the State], as it is in the Clean Water Act itself."

While the EPA does not approve or disapprove state TMDL implementation plans, it does have an interest in their successful implementation, and the agency has authority under other sections of the CWA to review individual actions states may take to implement TMDLs. For example, the CWA and its implementing regulations at 40 CFR 122.44(d)(1)(vii)(B) require that NPDES permits for point sources include water quality-based effluent limitations as necessary to implement applicable water quality standards and that are consistent with the assumptions and requirements of any available wasteload allocation established in a TMDL. Most states have delegated authority to issue NPDES permits, subject to EPA oversight. In four states, the EPA directly issues NPDES permits. As part of its CWA authority to oversee state-issued NPDES permits, the EPA can review and potentially object to provisions in state-issued permits, including trading provisions, that are not consistent with CWA requirements.

7. I do not believe EPA has any role in dictating to the states how to implement or achieve an established TMDL, whether it's through trading or other mechanisms. Courts have recognized that "there is no statutory language [in the Clean Water Act] requiring submission to or approval of a State's [TMDL] implementation plan by the EPA." Bravos" Green, 306 F. Supp. 2d 48, 57 (D.D.C. 2004). Do you know of any authority to the contrary?

Response: See answer to Question 6, above. The EPA is not aware of any authority to the contrary.

8. In your written testimony you also briefly discuss the general issue of nutrient pollution, and you reference "EPA's most recent National Aquatic Resource Surveys of aquatic health," which apparently examined various water stressors and found that "nitrogen and phosphorous are the most pervasive in the Nation's small streams and lakes," and that "[a]pproximately 50 percent of streams and more than 40 percent of lake acres have high or medium levels of nutrients." Am I correct in assuming that the Surveys you have referenced include EPA's draft National Rivers and Streams Assessment for 2008 and 2009, which EPA released this past February?

Response: No. The statements about the pervasiveness of nutrient pollution in the nation's small streams and lakes were based on the National Aquatic Resource Survey of lakes published in 2007 and the National Aquatic Resource Survey of small streams published in 2006.

9. I have deep concerns about EPA's draft Assessment. In order to determine water quality conditions across the country, EPA compared sampling results with conditions at "least disturbed" sites in different regions. According to EPA, this "least-disturbed" benchmark standard is defined as those sites that are "least-disturbed by human activities." In other words, the waterbodies examined by EPA in its survey were compared to waterbodies located in places where few, if any, people live-or, as EPA put it, those waterbodies where there is "the least amount of human ambient disturbance."

The problem this creates is that it prejudices the Assessment's analysis. No matter the improvements that farmers, municipalities, and industry have worked together to achieve to improve our Nation's waterways, many of the waterways will be determined as

unhealthy because they are compared to a world in which humans don't use water. EPA supposedly selected the sampling sites at random, however, it appears as if the Agency cherry-picked the benchmark from which to analyze the sites. EPA's flawed method accordingly led to a highly misleading Assessment. What was your involvement in developing this draft Assessment?

Response: The National Rivers and Streams Assessment (NRSA) is one of a series of National Aquatic Resource Surveys (NARS) implemented by the EPA's Office of Water and Office of Research and Development, and our state and tribal partners. The approaches used in the NARS program are based on a substantial body of peer-reviewed and well-documented scientific work. The draft NRSA report was peer reviewed in September 2012 by a panel of experts. The NARS program itself grew out of extensive research and pilot studies conducted by the EPA's Office of Research and Development in cooperation with states. The NARS program fills a critical gap in information on water quality identified by the Government Accountability Office, the National Research Council and other independent reviewers. NARS is a key program for assessing the condition of the nation's waters and tracking changes over time. NARS developed out of the need for a scientifically robust and statistically representative understanding of water quality conditions and trends in the U.S. It relies on nationally consistent lab and field methods, an unbiased and statistically valid framework for randomized selection of sites that represent the broader population of waters, and an ecoregion-based reference condition approach for interpreting the data.

The NRSA approach for developing benchmarks using reference conditions is consistent with current science, EPA guidance, state practice, and established protocols for ecological risk assessment. It is based on EPA guidance for development of nutrient criteria, which includes identification of reference reaches considered to be the least impacted systems of the region. It is important to emphasize that the NRSA findings are not Clean Water Act determinations of impaired water status. Such determinations are made by the states on specific waterbody segments using applicable state standards.

The EPA's approach for establishing reference conditions in the National Rivers and Streams Assessments is a well-documented, systematic process that screens sites using chemical and physical data to identify the least-disturbed sites within each ecological region. While some reference sites in some ecoregions have low levels of human disturbance, many are located in watersheds with substantial human use. For example, the percent of agricultural land use in watersheds used in establishing reference conditions for nutrients ranged from 0 to 99%. Approximately 13% of the reference sites used to establish thresholds across the country had more than 50% agriculture in the watershed.

The draft NRSA does not support the conclusion that rivers and streams in watersheds that have experienced human disturbance cannot meet the benchmarks for good condition developed using the EPA's ecoregional, reference-based approach. Based on the draft NRSA results, a substantial number of these sites are able to meet the thresholds for good condition. Across the country, for example, 335 of the NRSA sites have more than 50% agricultural land use in the watershed. According to the draft NRSA assessment, more than 20% of these 335 sites rated "good" for Total Nitrogen and a similar percentage rated "good" for Total Phosphorus.

I was involved in launching the NARS program nearly a decade ago. Throughout the planning, field work, and analysis phases of the draft National Rivers and Streams Assessment, I met periodically with staff implementing the assessment to review their work. I also reviewed the draft report prior to its release.

10. I appreciate EPA's willingness to offer input on the subject of nutrient trading. However, if the Agency is going to base its comments on flawed environmental analyses, then its recommendations will be called into question. Going forward on the subject of nutrient trading, can you commit to refraining from relying on the draft Assessment, or at least ensuring that EPA cures the various flaws I and others have identified [i.e. the American Farm Bureau] in the Assessment?

Response: The EPA does not believe that the approaches used in the draft National Rivers and Streams Assessment (NRSA) are flawed. The National Rivers and Streams Assessment, along with the other National Aquatic Resource Surveys (NARS), provides valuable information on the overall condition of our nations rivers and streams. While providing the first comprehensive and statistically representative picture of our nation's rivers and streams, the draft NRSA shows similar overarching patterns as state water quality assessments reports. Overall, both the state data in Section 305(b) reports and the NRSA show that a large number of our nation's river and stream miles are stressed by pollution. Both reports show that similar stressors (pathogens, sediment, and nutrients) are widespread and greatly affect our aquatic resources.

As described above, the EPA released the 2008-09 NRSA in draft format for public comment, and looks forward to reviewing the comments it has received as it prepares to finalize the Assessment.

It is important to note that the NRSA is not designed to provide information that identifies which potential management options, including trading, should be selected or implemented at a specific site or within a specific watershed, and the EPA does not use the NRSA information in this way.

Senator John Boozman

For Questions 1-3: In 2008, an organization called EarthJustice filed a lawsuit against EPA claiming that EPA was required by federal law to impose numeric nutrient criteria in Florida. In August of 2009, EPA entered a consent decree with EarthJustice to settle the 2008 lawsuit. In that settlement, EPA committed to finalize numeric nutrient standards in Florida. This was strongly opposed by the State of Florida, which believed they had been shut out of that process.

1. Mr. Shapiro, did the organization, EarthJustice, receive attorneys' fees from the federal government in association with the Florida numeric nutrient criteria case? If so, how much?

Response: Yes. The United States settled Earthjustice's request for payment of its costs of litigation, including attorneys' fees, for $198,997.00.

2. At the 2011 EPW hearing on this topic, a witness for the State of Florida testified that EPA's nutrient rule would cost over $1 billion. EPA said that the potential incremental costs associated with the Florida nutrient rule would be less than $25 million per year. Importantly, a committee of the National Academy of Sciences did an independent review of the rule's implementation cost. According to the Congressional Research Service, they found that EPA "underestimated the cost of implementing the rule and questioned the validity of several assumptions in EPA's cost analysis." Has EPA taken any steps in response to the National Academy review of EPA costs analysis?

Response: Yes, the EPA has taken steps to respond to the National Academy's review of the agency's cost estimates, where doing so has been appropriate in light of additional steps taken by the State of Florida to adopt its own numeric nutrient criteria.

On June 13, 2012, the State of Florida subsequently submitted its rules for numeric nutrient limits for lakes, flowing waters, and a set of estuaries and coastal marine waters. On November 30, 2012, the EPA approved these state rules. As a result, the agency did not go back and revise the economic analysis for the Phase 1 federal rule because that rule was superseded by the EPA's approval of the State of Florida's rules.

However, in the economic analysis for the coastal and estuary criteria (Phase 2) proposal published on December 18, 2012, the EPA made significant changes to its approach to address the NRC recommendations and suggestions.

As a result of recent actions taken by the State of Florida, the EPA anticipates that the combination of the State of Florida's actions and modification to EPA's 2009 determination (that federal numeric nutrient criteria were necessary to protect Florida's waters) should enable the agency to conclude that finalization of the federal numeric nutrient criteria contained in its November 30, 2012, proposal is unnecessary, following the EPA's approval of Florida's standards.

3. Will EPA incorporate the findings of the NAS report into its cost-benefit analysis practices?

Response: As noted above, the EPA has made significant changes to its approach to address the NRC recommendations that are applicable to the analysis of costs for the coastal and estuary criteria (Phase 2) proposal published on December 18, 2012. In response to the National Academy's review, the EPA incorporated many of the recommendations and suggestions made throughout the report, including:

- Using the Hydrologic Unit Code (HUC-12) watershed unit of analysis;
- Analyzing potential costs for unassessed waters that could be incrementally impaired;
- Analyzing costs for each industrial plant rather than extrapolating the results from a small sample;
- Reviewing actual experience from existing TMDLs to identify BMPs sufficient to meet numeric targets;
- Considering permeable reactive barriers for septic systems and their installation costs; and
- Considering uncertainty in government expenditures.

The EPA believes this revised approach sheds light on the costs and benefits associated with its numeric nutrient criteria rules and complies with the Executive Order requirements for conducting economic analysis of regulations.

4. Mr. Shapiro, you testified that "EPA recognizes that States need room to innovative and respond to local water quality needs and that one size fits all solutions to nitrogen and phosphorus pollution is not desirable or necessary." I agree. Do you agree that some states currently utilize this "room to innovate and respond to local water quality needs" by implementing narrative nutrient criteria?

Response: Some states have made progress by relying on narrative standards to control nitrogen and phosphorus pollution, but the implementation of narrative standards can often be difficult, resource-intensive, subject to litigation, and time-consuming. Progress has been made, but the EPA believes that further effort is needed to move more quickly and more comprehensively in order to make a difference in addressing the challenges of growing nitrogen and phosphorus pollution from increasing population, expanding and more intensive agricultural activities, and spreading urbanization.

Numeric water quality standards for nitrogen and phosphorus pollution can facilitate more rapid, effective, and efficient program implementation. Adopting numeric standards has a number of key advantages, including easier and faster development of Total Maximum Daily Loads and quantitative targets to support trading programs; easier to write NPDES permits; increased clarity in evaluating the success of nitrogen and phosphorus runoff minimization programs; and more measurable, objective water quality baselines against which to measure environmental progress.

5. Mr. Shapiro, you mentioned, as a "noteworthy case," Connecticut, where municipal wastewater treatment plants are trading to achieve nitrogen reduction goals for the Long Island Sound. Has the EPA considered proactively facilitating dialogue or other forms of

information exchange between experienced trading stakeholders (such as these Connecticut municipalities) and other entities that are interested in exploring trading opportunities?

Response: Yes, the EPA continues to actively support sharing the knowledge and experience gained from one state to another as they choose to develop trading programs. For example, the EPA sponsored a trading workshop in November 2012 with many stakeholders, including states, private sector agricultural consultants, the U.S. Department of Agriculture, environmental market non-governmental organizations, and for-profit conservations "banks."

6. Mr. Shapiro, in your testimony, you mentioned that Virginia encourages the creation of pools of credits ahead of the market, thereby providing additional certainty for some potential trading participants. Would you please share any views you may have on the benefits or drawbacks to this approach?

Response: The EPA defers to states on how they wish to design their trading programs to maximize the efficiency of such programs. In observing programs across the country, we have observed that several states have expressed interest in creating "banks" (reserves of credits) or developing lists of potential willing credit suppliers. We believe the Virginia approach provides an easily understood example that other states may follow if they choose to do so, and we look forward to working with states to ensure that the trading programs they develop are effective and consistent with the Clean Water Act.

7. Mr. Shapiro, given that, as one of our witnesses testified "water quality based effluent limitations are placed in permits, where there is the narrative" criteria, do you believe it would be possible to set-up an effective nutrient trading program in states that have narrative nutrient criteria? If so, please elaborate. If not, why not?

Response: Both narrative and numeric criteria for nutrients provide the legal bases for developing TMDLs, watershed loading analyses, and numeric water quality-based effluent limits in NPDES permits. The primary difference is that narrative criteria must first be translated into numeric water quality "targets" to enable development of allowable nutrient loadings and enforceable water quality-based effluent limits. This translation is often a technically challenging process.

Once narrative criteria have been translated into numeric water quality targets, and these targets are used to establish water quality-based effluent limitations, trading can proceed as it would if the criteria were numeric. In other words, both narrative and numeric criteria are translated into permit limits, and it is only after those limits are set that trading would occur.

8. Mr. Shapiro, do you support EPA cooperation on nutrient trading with states that would prefer to maintain narrative nutrient criteria?

Response: The EPA believes that trading can be accomplished pursuant to both numeric and narrative water quality criteria. However, doing so for a numeric criterion is typically more straightforward than for a narrative criterion, because the narrative criterion would typically need to first be translated into a numeric water quality "targets" to enable development of allowable

nutrient loadings and enforceable water quality-based effluent limits. In this way, numeric nutrient criteria provide some advantages, such as efficiency and measurability, that may more easily facilitate trading.

9. Mr. Shapiro, do you agree that various quantifiable water quality conditions, such as algal biomass accumulation, can be used to effectively determine whether certain water quality objectives are being achieved, in states that have narrative nutrient criteria?

Response: Various qualitative and quantitative water quality measures are currently being used by states that have narrative nutrient criteria to determine whether certain water quality objectives are being achieved (i.e., designated uses are being met). However, the EPA believes that relying solely on monitored responses to nutrient pollution is not necessarily the most effective and efficient manner to protect designated uses and maintain the physical, chemical and biological integrity of our nation's waters for several reasons. This is why the agency has strongly advocated for states to adopt numeric nutrient criteria for over fifteen years.

- First, relying solely on response measures may allow a waterbody to reach a heavily polluted and degraded state before corrective actions can be taken to address the problem. Addressing pollution problems before they cause harmful impacts may be less expensive for communities than waiting for harmful impacts to occur before taking action. Response measures that measure only these harmful impacts after they happen may make cleanup more costly. For example, using a response indicator such as algal biomass on its own to measure waterbody health could prevent detection of a water quality problem until algal biomass begins accumulating (as in an algal bloom). Once such a bloom begins, it could worsen to the point where vacationers do not want to swim, other aquatic life is smothered, or fish kills occur. It is difficult to catch these types of responses in an early-enough stage to allow the state to identify the need for and then implement corrective actions to reduce the amount of nutrient pollution entering the waterbody before a use is actually impaired.
- Second, response measures can be masked by other pollution problems in a particular waterbody. For example, sediment or other toxic pollutants can in some cases prevent the growth of algae even when nutrient levels are high. If a state were to rely solely on the presence of algae for assessing the health of a waterbody, then the waterbody might appear healthy as a result of high toxics or sediment and high nutrients. However, if the toxics or sediment pollution were later controlled, the waterbody could see a significant, unexpected, and uncontrolled algal response.
- Third, when a state relies solely on the response at a given site, nutrient pollution may continue to create problems downstream. In these cases, if the near-term problem were ignored, larger scale corrective actions – potentially in the form of watershed-wide TMDLs – might become necessary to correct the resulting problem in a downstream estuary or coastal area.
- Finally, relying solely on response measures requires the permit writer or TMDL developer to develop a quantifiable target for the pollutant of interest (namely nitrogen and/or phosphorus) on a permit-by-permit or TMDL-by-TMDL basis. With respect to TMDL development, the quantifiable target provides the basis for determining the allowable pollutant load necessary to attain water quality standards. With respect to NPDES permits, the quantifiable target provides the basis to develop enforceable water

quality-based effluent limitations to prevent water quality impairments where a discharge may cause, have a reasonable potential to cause, or contribute to an excursion above applicable water quality standards.

The EPA is aware that some states are interested in using response measures in combination with numeric criteria for nitrogen and phosphorus. The EPA has led several workshops on this approach, bringing together scientists and state managers to discuss the issue. The EPA is currently evaluating how this can be done with sufficiently robust indicators that provide a clear early indication of the effect of nutrient pollution. In approving the State of Florida's recent numeric water quality standards, the EPA determined that Florida's new method of applying numeric limits for the amount of nutrient pollution allowed in lakes and streams takes into account quantifiable response measures in a manner that is scientifically sound, and more effective and efficient than the state's previous narrative nutrient criterion approach. This approach is used to identify and prevent nutrient pollution in lakes and streams, and also addresses the need to protect downstream waters.

10. Mr. Shapiro, what hurdles, if any, need to be cleared in order to allow effective nutrient trading to occur in a watershed or a defined area for which a TMDL has not been approved?

Response: While a TMDL is not necessary to institute a trading program, it is often the most effective driver to push facilities toward the need to trade, and often offers significant watershed analyses that are extremely helpful in setting up a trading program. However, the EPA does not see any regulatory hurdle to trading *before* a TMDL has been established.

11. Mr. Shapiro, generally speaking, what would be the downsides to legislation that would dictate how states implement water quality trading programs?

Response: As mentioned above, a one-size-fits-all approach is not the EPA's preference for trading, as flexibility in implementation is one benefit of trading, and legislation could run the risk of inhibiting that flexibility. At the current time, the EPA believes that the Clean Water Act provides sufficient flexibility to enable states to establish water quality trading programs, and looks forward to working with states interested in developing such programs.

12. Mr. Shapiro, do you agree that water quality monitoring can be very expensive, and that in order to effectively measure non-point source reductions, without discouraging participation in a trading program, it is most practical and prudent to carry out such monitoring on a watershed basis?

Response: Yes, the EPA recognizes that water quality monitoring can be costly for states, and we share your interest in ensuring that monitoring is as efficient and effective as possible. At the same time, the EPA believes that monitoring is a critical element in water quality trading programs to ensure that pollution reductions can be demonstrated. The EPA's Water Quality Trading Toolkit and other resources can help provide guidance to states on how to develop effective and efficient monitoring programs to support trading.

Senator CARDIN. Thank you very much for your testimony.

I take it from your testimony that it is the Administration's position that nutrient trading is a tool that is available, that can be used under the Clean Water Act?

Mr. SHAPIRO. That is correct.

Senator CARDIN. So the legal authority for that, you believe, is clear?

Mr. SHAPIRO. We believe that it is consistent with the Clean Water Act. Obviously the type of trading and the conditions under which it is done would affect its acceptability under the Clean Water Act. But we believe properly constructed trading is absolutely consistent with the Clean Water Act.

Senator CARDIN. And there are many States moving forward with various types of trading programs that you have mentioned. In the Chesapeake watershed, I believe Pennsylvania was the first to proceed with non-point source, and dealing with trading in that regard. What is the role for the Federal Government in the strategy for a multi-jurisdictional body of water, such as Chesapeake Bay? What do you see the role for the EPA or the Federal Government in facilitating or coordinating how nutrient trading is done or whether it should provide further incentives for the effectiveness of nutrient trading?

Mr. SHAPIRO. Senator, as you know, EPA has had a very active role in developing the Total Maximum Daily Load, the TMDL framework, which is the kind of construct for achieving water quality improvements in the Bay watershed. We did that collaboratively with the seven Bay jurisdictions. The framework in that TMDL document lays out trading as it is clearly allowable and often a desirable component of State programs to achieve the nutrient reductions that are needed.

We don't necessarily see that EPA would lead an effort to develop an interstate trading program. But if the States that are participating in the work on the Bay are interested in it and believe that there are some opportunities to move forward, we will be happy to work with them, provide technical support as well as other forms of support to ensure that an interstate trading program would be effective and would be able to meet the requirements of the TMDL.

Senator CARDIN. So today, if the States of the Chesapeake watershed wanted to set up an interstate trading program, it could do that, they have the authority to do that currently under the Clean Water Act and the implementation of the plans? They could do it without, they don't need additional guidance from the Federal Government in order to set that up?

Mr. SHAPIRO. We would want to work with them very closely to make sure that as they move forward the training program they are developing continues to meet the requirements of the Clean Water Act and the pollutant reduction goals of the TMDL. But yes, we believe they have the authority to do that. The TMDL as well as the Clean Water Act would allow them to proceed in that direction.

I don't want to overstate the ease by which that could be done. It would be a challenging institutional effort to work across different State programs, try to align State programs in a way that

a purchaser in one State and a seller in another State could do that effectively, meeting the requirements of both States as well as continuing to stay within the scope of the TMDL.

So it would be, I think, a challenge, but it is certainly something that can be done.

Senator CARDIN. I know there is concern by the individual States that without some direct guidance from the Federal Government that is a challenge to try to organize an interstate trading program. There is also the concern as to how you do this in a fair manner that, yes, we have TMDLs as the overall goal, but how do we ensure that the different sectors are being treated fairly?

This is the point that I think Senator Vitter and Senator Boozman mentioned earlier about the concern of agriculture, they want to make sure that this is not just a way of asking the agriculture sector to do more than their fair share in cleaning up Chesapeake Bay watershed.

How do the States move forward with that, without some additional guidance from the Federal Government on interstate trading programs?

Mr. SHAPIRO. I think the basic kind of fairness issues that you referred to in terms of the allocations, they are called load allocations in the TMDL, have already been decided upon by the individual States. EPA did not dictate specific controls, nor could we, for non-point sources, such as agricultural communities. We, working with the States, established load allocations and each State has developed its proposal, which we have reviewed, for achieving those load allocations, including contributions that they would be gaining from the agricultural sector as well.

A trading program wouldn't change what I called earlier baseline allocations. A trading program would merely set up rules, either within a State, as has already been occurring, or across States that would allow a farmer who wishes to reduce pollution further than what is already allocated in the State's implementation plan, that increment of reduction that would provide them a vehicle for selling that increment to someone who finds it more expensive to control their pollution.

So it does not change the basic equities of the allocation. It merely creates some vehicles to harness the economy to work more effectively for the environment.

Senator CARDIN. Let me just mention one other concern that has been brought to my attention from the agricultural community, and the reason why they believe that Federal action may be necessary for an interstate nutrient trading program. They don't know what the market will bring. There is no certainty as to what the values will be of the credits. You are asking primarily farmers under nutrient trading to do more, because that is usually the area where you look at where you can get the most credits. Without the Federal Government providing some assurance that there will be a market for the credits, there is a concern as to whether this in fact will work in the real world.

Do you share that concern and do you see a role for the Federal Government in perhaps providing more certainty as to the market parameters of a nutrient trading program?

Mr. SHAPIRO. Well, a couple of points in response. First, it should be obvious but I want to make it clear, no one would be forcing anyone to participate in a trading program. A farmer could elect to wait to see what other people do. They could just decide it is not worth their attention.

And so it is not that we are saying farmers or anyone else has to make investments in producing what are referred to as credits, nutrient reductions in excess of their requirements. It is something they can elect to do. And as in any market, someone who is making a market-based decision is facing some degree of uncertainty. You don't know that there will be guaranteed demand for your product, although some trading programs can be set up in a way that allows the transaction to occur before any investment is really made.

There are State programs, I think Virginia is an example, that has encouraged the creation of pools of credits ahead of the market, and therefore provided some facilitation to the market. There are other kinds of strategies, I think, that we could work with the States to identify that might lower the degree of uncertainty and facilitate other aspects of trading activities. But at the end of the day, it is a market and it is going to be ultimately subject to some degree of uncertainty as markets are. Someone comes up with a new whiz-bang wastewater treatment plant technology that reduces the cost of removing nutrients at wastewater treatment plants by a factor of 10, nutrient reduction might be much easier to do than trading.

So those are uncertainties. But I think overall we believe that the studies we have looked at indicate that there is a substantial savings that can be achieved today by encouraging trading, especially point to non-point source trading, and that there will be a market. But the design of the institutions and the structures around the trading program is an important element that can help ameliorate some of the uncertainties that farmers might face.

Senator CARDIN. Senator Boozman.

Senator BOOZMAN. Thank you, Senator Cardin.

I would like to follow up. I think the certainty issue really is a major issue. Let's consider a small rural wastewater treatment facility that faces a choice on the one hand, participating in a nutrient trading program, and then on the other, purchasing the technology, the control technology. If they purchase the control technology they would have the feeling that they have acquired something tangible, and as we know, these are expensive propositions.

An EPA permit writer that comes back to review their permit in 5 to 10 years will see the technology as a real asset, making it quantifiable improvements. However, if they instead choose to purchase an offset from a large municipal wastewater treatment plant, the results may be quantifiable, but the offset purchaser may not feel like they truly have something to show for their investment. I think that this can be overcome and can be addressed through a well-structured trading program developed at the State level in cooperation with EPA.

Can you talk about that? What does EPA do in these kinds of situations to provide assurances that the permit recipients, that these cost-effective options will be recognized on an ongoing basis?

Mr. SHAPIRO. Well, in the case you are talking about, it would be a point source to point source trade, which means some of the uncertainties that we deal with in a non-point situation wouldn't be present. And the trade would be reflected in the permits of the two facilities. As you know, and this is the point I think you were making about uncertainty, under the Clean Water Act, permits are on a 5-year cycle. They come up for renewal. I think as long as the effluent limits are being met and the load allocations under the TMDL are being met, there would be no Federal basis for forcing a change in the situation.

I think that some of the uncertainty that a small plant might face at some point in time is that as, if population, for example, grows, at some point a larger facility may feel like it needs to use more of its capacity to meet its own population demands, in which case at some point the smaller facility might lose the opportunity to continue to purchase credits. That is one of the uncertainties. There are certainly ways of, through contractual arrangements, dealing with those uncertainties. It is not something that the Federal Government necessarily could commit to in terms of locking people into certain permit conditions.

Senator BOOZMAN. Regarding participation from agriculture, would you support arrangements that would enable, for example, USDA and State conservationists to take the lead in verification of best management practices being implemented by non-point sources?

Mr. SHAPIRO. We want to work very closely with the Department of Agriculture. We are working very closely with them. I can't speak to the details of the specific arrangement you just mentioned, but certainly those are the kinds of options we would want to look at. We realize that they have a lot of expertise, they have field capacity to support it. Again, though, these are largely programs that are going to be implemented by the States, so the working relationships would be, in our view, largely relationships between the Department of Agriculture or the local or the State agricultural agencies and the State regulatory agencies that have the implementation responsibility for the TMDL. EPA would not routinely be doing the direct verification and implementation in that kind of a situation.

Senator BOOZMAN. Good, thank you. These are things that again, in talking to the farm community, come up.

Another thing, do you believe that onsite water quality monitoring would discourage participation by non-point sources? Just having, again, the onsite come out to your place?

Mr. SHAPIRO. Well, again, we talk about some of the uncertainties that we are dealing with and trying to give predictable, defined credits to non-point sources. And in order to do it in an effective way, there has to be some ability to verify that the activities that are committed to under the trading arrangement are absolutely being implemented. One way of doing that in some cases is not necessarily the right approach in all cases. In some cases, it is to do onsite or nearby water quality monitoring. Other types of verification include making sure that if a certain buffer strip, for example, has been committed to as part of the agreement, that

buffer strip is actually there, that it is being maintained over time and so forth.

So there are a variety of arrangements that could be developed to verify particular non-point source control approaches. But onsite monitoring in some cases might be the most effective in terms of actually demonstrating the ongoing effectiveness of a particular type of technology.

Senator BOOZMAN. Right. You mentioned in your testimony that Virginia's program is phased, requiring point sources to trade among themselves before they begin trading with landowners. Do you have an opinion on that? Do you see any merit one way or the other?

Mr. SHAPIRO. Well, EPA doesn't have a strong opinion. I would say that Virginia is out ahead, but like a lot of States they are still relatively new at implementing major trading programs. As indicated earlier, trading between point sources is a little bit easier because of the fact that everyone is under a permit already, they have a monitoring history, they have what is called a waste load allocation, which is a particular requirement under the TMDL.

So the job of figuring out the trades and verifying them is a little bit easier. It is a good way of getting a program working and starting. And then adding non-point sources to the program a little bit later gives you the chance to have the basic machinery in place as you are dealing with some of the more challenging issues.

But I think you will be hearing later about some of the work that has been done in Virginia. It does look like people have put a lot of thought into creating pools of credits from non-point sources. Again in Virginia, even though that piece of the program is a point to point, growth has to be handled through offsets with non-point sources, or not has to, but it can be handled through non-point sources. So there already is a mechanism for doing some trading in Virginia for offsets.

Senator BOOZMAN. And very quickly, final thing, what can EPA do to help the States that are looking at this situation? What kind of resources can you all offer a State that is looking at the Virginia model or some other model? Are there particular resources that EPA can help in that regard?

Mr. SHAPIRO. Well, some of the grant funding that has been made available to States under our Section 106 Clean Water Act funding, under Section 319, which is specifically for non-point source planning and control, as well as some of the money that has been made available specifically through the Chesapeake Bay program and resources for implementation can be used by States to develop some of these tools and processes. So there are resources already available.

As I indicated, we are also willing and able to provide technical assistance to States, especially in dealing with novel issues that may come up. We feel that we have an important stake in the TMDL, in the Chesapeake Bay TMDL succeeding, and in it succeeding in a way that is as effective and efficient and beneficial to the communities involved as possible. So we want trading to work. We think it, as I indicated earlier, we think it is an important tool, an important element of successful undertaking in the Chesapeake Bay. So we are willing to provide technical assistance as we can.

Senator BOOZMAN. Thank you.

Senator CARDIN. Just for clarification, did you say Virginia does permit non-point trading?

Mr. SHAPIRO. For offsets. It is my understanding that they current allow that for offsets. That is the issue of dealing with new growth. If you are a developer coming in or you are expanding an existing development, the pollution associated with that, if there is runoff caused by your site or other activities that lead to increased nutrient pollution, that has to be offset. One way of achieving those offsets is to, at least in the tributaries to the Bay specifically, is by purchasing offsets from non-point sources.

Senator CARDIN. From non-points, they can purchase from non-points?

Mr. SHAPIRO. Yes, sir.

Senator CARDIN. Thank you very much for your testimony. We appreciate it very much.

Mr. SHAPIRO. Thank you.

Senator CARDIN. The second panel, let me introduce them and invite them up. We have Dr. Beth McGee, who is the Senior Water Quality Scientist for the Chesapeake Bay Foundation; Mr. George Hawkins, the General Manager of D.C. Water; Dr. Marty Matlock, Professor, Department of Biological and Agricultural Engineering, Area Director, Center for Agricultural and Rural Sustainability, University of Arkansas; and Ms. Susan Bodine, Partner, Barnes & Thornburg. Welcome, all.

Senator Boozman has already acknowledged two members of our panel. We appreciate all four of you being here. Your full statements will be made part of the Committee record, and we will start with Dr. McGee.

STATEMENT OF BETH McGEE, SENIOR WATER QUALITY SCIENTIST, CHESAPEAKE BAY FOUNDATION

Ms. MCGEE. Good afternoon, Mr. Chairman, Ranking Member Boozman. Thank you for inviting me on behalf of the Chesapeake Bay Foundation to participate in today's hearing.

You have my written testimony, and what I would like to do is build upon Mr. Shapiro's testimony and draw from our experiences in the Chesapeake Bay watershed. You have heard that we have a Bay-wide TMDL in the Chesapeake Bay for nitrogen, phosphorus and sediment. The States and jurisdictions are relying on nutrient trading to achieve and maintain the pollution limits that are called for in the TMDL.

I want to emphasize this issue of maintain. It came up in the last comments from Mr. Shapiro, which is that the trading markets are likely going to involve not only trading among existing sources, but the market will also probably come from new sources that are going to need to offset these new loads.

So critics of nutrient trading will argue that trading allows point sources to pay to pollute, that trading may lead to localized water quality hot spots, that the reductions might not be real or verifiable. CBF shares some of this skepticism. But we actually believe that there is a way to design it and implement trading programs in a way that ensures that they are cost-effective and environmentally beneficial.

The key to success is to have the necessary safeguards in place. These include things like a standardized process to evaluate permits to ensure that they don't result in degradation of local water quality, third party verification of credit-generating practices, a transparent process so that the public can have access to information about trades, and review and provide comments on them.

The Bay States have actually worked on trading programs for nearly 10 years now. Unfortunately, they evolved independently and for that reason, there are very significant differences among the State trading programs within the Chesapeake Bay. EPA is developing technical memoranda that will help level the playing field and provide some regulatory certainty. But we think there are other reasons why a trading program hasn't really taken off in the Chesapeake, and Congress might be able to help here.

The most costly and challenging aspect of implementing the Baywide TMDL will be reducing stormwater pollution. That is the most expensive thing that we need to do. And because of this high cost of compliance, the trading experts actually say that is probably where the demand is going to come from. It is going to be the local governments holding stormwater permits.

A recent study by a group called RTI International found that local governments with stormwater permits could save, and this is within the Chesapeake, could save millions of dollars if they purchased credits to meet at least a portion of their pollution reduction targets. However, they face several challenges. For one thing, most local governments don't have the resources or staff time to figure out how trading could actually work for them. There are pretty significant legal, technical and policy issues that need to be identified and overcome.

Congress has provided some support for addressing these issues through the Conservation Innovation Grant Program in the Federal Farm Bill. In addition, I mentioned that EPA's technical memoranda that they are developing for the Chesapeake Bay should help provide some regulatory certainty. But in particular, we think the technical memoranda dealing with urban stormwater sources should specifically clarify that stormwater permittees can trade. Right now, the policy that is governing point source trading is the Permit Writers Water Quality Trading Tool Kit. From our read of that, it is really geared toward more traditional point sources and not stormwater permittees.

As we have talked about, farmers are viewed as the likely sellers in nutrient trading markets, because the cost of reducing pollution from agriculture tends to be cheaper than from other sources. That said, and we have heard a little bit about this, there are a variety of reasons why agricultural producers aren't stepping up to the plate on trading. Some of it is, quite frankly, just a lack of knowledge about the trading programs. Some of it is lack of knowledge about what conservation measures they need to implement on their farm in order to participate, and whether that might change over time. There are concerns about third party verification, concerns about data privacy. And we have also heard that farmers, quite frankly, don't want to be viewed as allowing someone else to pay to pollute.

Again, Congress has helped in this regard by providing funding to the Conservation Innovation Grant Program that is helping overcome some of these obstacles. So we urge Congress to continue their support for this program and others like it. We also encourage them to continue to encourage EPA and the USDA to work together on nutrient trading.

Last, I want to highlight that Federal programs like the Clean Water Act Section 319 program, the Clean Water State Revolving Loan Funds, the conservation programs in the Federal Farm Bill, are really important for trading. They are going to help farmers get up to the compliance level they need to be in order to participate in these markets.

So with that, I would encourage this Committee to increase its support for these programs and extend thanks to Chairman Cardin for his leadership on this issue. While trading is developing throughout the Country, there are a lot of eyes on the Chesapeake region. So we really need to do it right here.

With that, I will end and thank you and take questions at the end.

[The prepared statement of Ms. McGee follows:]

CHESAPEAKE BAY FOUNDATION
Saving a National Treasure

Statement of Dr. Beth L. McGee
Senior Water Quality Scientist, Chesapeake Bay Foundation

Prepared for a hearing entitled
"Nutrient Trading and Water Quality"

United States Senate Subcommittee on Water and Wildlife

May 22, 2013

Good afternoon Mr. Chairman and Members of the Subcommittee on Water and Wildlife, I am Dr. Beth L. McGee, Senior Water Quality Scientist at the Chesapeake Bay Foundation (CBF). Thank you for inviting me, on behalf of CBF's Board of Trustees, staff, and more than 200,000 members, to participate in today's hearing.

For more than 40 years, the CBF has been working to protect and restore the Chesapeake Bay. The Chesapeake Bay is America's largest estuary, and its 64,000 square mile watershed – from Cooperstown, New York to Cape Henry, Virginia and westward to the Allegheny Mountains – is a large part of the Mid-Atlantic states. More than 17 million people live in the Chesapeake Bay watershed, a number that is increasing by roughly 150,000 each year.

If you follow CBF's State of the Bay report, you know that the slow rate of progress being made to improve water quality and protect the living resources of the Chesapeake Bay continues to cause very serious concern. The numeric score that our scientists calculated last year to represent the overall health of the Chesapeake Bay – 32 on a scale of 100 - means that the Bay is ecologically functioning at only about one-third of its historic capacity, and is not improving nearly as fast as we would like. The most systemic problem continues to be an overload of nitrogen and phosphorus pollution creating a lack of dissolved oxygen in many parts of the Bay and its tributaries. Every summer, the mainstem of the Bay and several of its tributaries are plagued by dead zones, where not enough dissolved oxygen exists to sustain many forms of aquatic life. The volume of water affected by these dead zones varies by year, but on average about 80% of the Bay and its tidal rivers have

PHILIP MERRILL ENVIRONMENTAL CENTER | 6 HERNDON AVENUE | ANNAPOLIS, MD 21403
410/268-8816 | FAX: 410/268-6687 | WWW.CBF.ORG

insufficient levels of oxygen. The Bay's problems are not unique – coastal and estuarine systems around the county and the world suffer from similar problems.

The good news is that in 2010 the Environmental Protection Agency (EPA) and the Bay jurisdictions established a Clean Water Blueprint for the Bay. This blueprint consists of the science based pollution limits for nitrogen, phosphorus and sediments as described in the Chesapeake Bay Total Maximum Daily Load (http://www.epa.gov/chesapeakebaytmdl/) and the state-specific plans to achieve those limits. To develop these plans, Bay jurisdictions worked with local governments to take advantage of local knowledge about sources such that the pollution reduction requirements were equitably distributed and one sector was not burdened at the expense of another. However the cost to reduce pollution varies greatly between sectors. To maintain costs while ensuring all sectors do their part, all of the Bay jurisdictions are relying, to some extent, on nutrient trading to meet and maintain these pollution limits.

Nutrient trading involves the exchange of allocations between pollution sources. The sources can be "point sources" such as wastewater treatment plants or "nonpoint sources" such as runoff from farmland and urban/suburban areas. It is based on the premise that the cost to reduce water pollution differs between sources, so entities that are able to economically reduce their annual pollutant discharges below regulated or permitted levels are allowed to sell their "surplus" reductions to entities facing higher pollution reduction costs. For example, the cost of one pound of annual nitrogen load reduction is many times higher in the stormwater sector than in the wastewater and agricultural sectors.

Critics of nutrient trading will argue that trading allows point sources to "pay to pollute" rather than cleaning up their own emissions. Concerns have also been expressed that trading may lead to localized pollution hotspots, pollution reductions will not be real or verifiable, or that trading is simply not allowed under the Clean Water Act. CBF shares some of this skepticism, but believes that it is possible to properly design and implement nutrient trading programs which can be used to achieve and maintain the Bay's pollution limits in a cost-effective and environmentally-beneficial manner.

In particular, the most costly and challenging aspect of complying with the Bay-wide pollution limits will be reducing and maintaining pollutant loadings from urban/suburban stormwater. The majority of the

responsibility will fall to local governments, many of which currently lack the technical and financial capacity to achieve and maintain the necessary pollution reductions. In addition, large urban areas hold water pollution permits that require substantial pollution reductions. A recent analysis by RTI International, sponsored by the Chesapeake Bay Commission, found that these permitted entities could save hundreds of millions of dollars per year if they purchased credits from a source like farmers, in lieu of implementing retrofits to meet at least a portion of their pollution reduction targets (http://www.chesbay.us/Publications/nutrient-trading-2012.pdf). Furthermore, as the region's population continues to grow, trading provides a framework to track and offset the inevitable additional pollution loads associated with new development – ensuring the pollution limits will be maintained, once they are achieved.

The key to successful nutrient trading in the Chesapeake Region is to have the necessary safeguards in place to ensure reductions are real and verifiable. In this regard, trades involving nonpoint sources are more of a challenge because measuring and counting the nutrient reductions is difficult. These safeguards include: ensuring trades do not degrade local water quality, verifying and monitoring implemented practices by independent third parties, creating legal mechanisms that make sure the necessary reductions are achieved, and making the entire system transparent and accountable to the public by providing public access to information on proposed trades and the opportunity for the public to provide input.

In the Chesapeake Bay region, nutrient trading is not new – states started developing policy and regulations nearly 10 years ago. Unfortunately, these programs developed independently, resulting in some significant differences among the state trading regulations and policies. EPA is in the process of developing technical memoranda that will help level the playing field and provide some regulatory certainty. But there are also other reasons why a robust trading market has not yet developed. There are issues with supply and demand that Congress can help address.

How to stimulate demand: Help local governments enter the market.

As the RTI report highlights, many local governments will need to reduce pollution from their stormwater systems to meet their share of pollution reductions – at a high cost. Nutrient trading offers them a potential cost-

savings, so experts believe local governments are likely to be the "buyers" in the nutrient trading market. However, they face several challenges.

With increasingly reduced budgets and staff, most local governments don't have the resources or staff time to figure out how trading could actually work for them – they have never done it before. So, there are lots of technical, legal, and policy issues that need to be identified and overcome e.g., how do we ensure local water quality is protected? How do we determine how much of their stormwater obligation, can be met through purchasing credits?

Congress has provided some support for answering these questions and helping the states establish their trading programs and policies through the Conservation Innovation Grant program in the Farm Bill. EPA's technical memoranda on trading will also be helpful. But like all things, the "devil is in the details." Consequently, via a private grant, CBF is partnering with the World Resources institute on a pilot project to work with select local governments to take them through the process of transacting an actual trade. The lessons learned from this pilot, we hope, will be useful to inform policy not only in the Bay watershed, but other parts of the country.

One of the things we have already learned is that buyers want – and need -- regulatory certainty. So, it is important that EPA clarifies that municipalities with stormwater permits may meet some of their permit requirements through purchasing credits. Specifically, we recommend that EPA, in its technical memorandum on trading and municipal separate storm sewer systems (MS4s) clarify/expand what is in their 2007 Water Quality Trading Toolkit for Permit Writers to explicitly cover MS4s. The document currently seems geared toward "traditional" point sources. In addition, EPA must continue to clarify their regulatory expectations, including issues related to grandfathering credits and baselines that may change due to the re-evaluation of the Bay TMDL in 2017, such that both "buyers" and "sellers" are confident that they will not be at legal or financial risk if they participate in trading. EPA must also work with, and oversee, state trading programs and permits containing trades to ensure the verification mechanisms are transparent and provide accountability.

How to stimulate supply: Help agriculture enter the market.

Farmers are viewed as the likely "sellers" in nutrient trading markets because the cost to reduce pollution from agriculture is inexpensive, relative to other source sectors. That said, for a variety of reasons, agricultural producers have been somewhat reluctant, to date, to participate in trading. Reasons include: lack of knowledge about trading and what level of conservation is necessary in order to participate, concerns about third party verification and data privacy, the perception that trading allows others to "pay to pollute." Again, Congress is helping address this through the Conservation Innovation Grant (CIG) Program in the Farm Bill. CBF is the lead on one of several grants focused on nutrient trading in the Chesapeake Bay. Our project includes outreach to farmers on trading and helping them determine whether they are eligible to participate in the trading market by using a farm scale nutrient calculator that allows them to estimate the pollution reduction benefits of conservation practices they have implemented on their farms. And even with a tool like this calculator to help them learn about their land's potential to create credits, farmers aren't ready to start trading. They continue to ask for certainty related to the TMDL regulatory framework. This is understandable -- they need to invest time and money to create credits to sell and before they do, they want certainty about the levels of conservation they must put on their land to qualify to begin generating credits, how those credits will be calculated and verified, who has access their farm data if they participate, and who will be buying their credits, when. These are questions that EPA, with assistance from USDA, must answer for them with utmost clarity and provide to them through trusted information channels and validators in the farming community. We encourage this Congress to provide continued support for developing innovative tools through programs like the CIG and to encourage continued collaboration between the Agencies to put those innovations to use in support of Clean Water Act goals.

Lastly, we want to underscore that Federal programs to address nonpoint source pollution -- the 319 Grant program under the Clean Water Act and the conservation programs in the Federal Farm Bill -- are very important. They are key to help farmers comply with the baseline requirements needed for them to enter the nutrient trading markets and generate credits. We continue to be concerned that the volume of support provided through these programs is not sufficient to meet the conservation goals the Congress and the States have set for the Chesapeake

Bay. To this end, we encourage the Committee to increase its support for this issue and extend our sincere thanks to Chairman Cardin for your leadership on this issue – both on this Committee and in relation to the Farm Bill.

Conclusions:

While trading is developing throughout the country, there are lots of eyes on the Chesapeake region because of the sheer scope and audacity of our goal to restore this national treasure. We need to do trading "right" so that it meets the needs of stakeholders and results in real, verifiable pollution reduction that, ultimately, result in a vibrant, productive Chesapeake Bay. We are grateful for the support of EPA in providing guidance to help harmonize key aspects of the states' trading programs and to USDA for continuing to promote nutrient trading and other environmental markets via grants, workshops, and other forums. We hope we have clearly highlighted the need for continued Congressional support to do more. Thank you once more, Mr. Chairman and Members of the Subcommittee, for the opportunity for CBF to participate in today's hearing. I would be pleased to respond to your questions.

Questions from Senator Benjamin Cardin:

1. Can you discuss the economic and environmental impacts of excess nutrient pollution? What are the costs of not reducing nutrient pollution?

Congress has recognized that the Chesapeake Bay is a "national treasure and resource of worldwide significance." [1] It is North America's largest and most biologically diverse estuary and its watershed provides the more than 17 million people that live in the region, diverse commercial and recreational opportunities. Hence, the protection and restoration of the Chesapeake is essential for a healthy and vibrant regional economy. Failure to "Save the Bay" threatens this economic driver. In fact, economic losses have already occurred due to water-quality degradation throughout the watershed. In 2012, the Chesapeake Bay Foundation released a report entitled "The Economic Argument for Cleaning up the Bay and its Rivers" that describes many of these environmental and economic impacts. We ask the attached report be included as our part of response (see attached).

2. Your testimony described how a nutrient trading program could help to reduce nutrient pollution in the Chesapeake Bay. What are the economic benefits of a nutrient trading program? How can nutrient trading lower costs for reducing nutrient pollution?

Nutrient trading is a market-based strategy for meeting a defined water quality goal. In the Chesapeake Bay region the goal is the pollution limits for nitrogen, phosphorus and sediment established by the Chesapeake Bay Total Maximum Daily Load (TMDL) for the six watershed states and the District of Columbia. Nutrient trading involves the exchange of allocations between pollution sources. The sources can be "point sources" such as wastewater treatment plants or "nonpoint sources" such as runoff from farmland and urban/suburban areas.

Nutrient trading takes advantage of the fact that individual sources of pollution face different costs of compliance, so entities that are able to economically reduce their annual pollutant discharges below levels required by the TMDL are allowed to sell their "surplus" reductions to entities facing higher pollution reduction costs. The combined result is an overall achievement of the pollution load reductions at a lower cost. For example, the cost of one pound of annual nitrogen load reduction can be as high as $ 1,000 per pound per year in the stormwater sector compared to $100 to $200 per pound per year for the agricultural sector. [2] For this reason, experts believe that large urban areas that hold water pollution permits will be the likely "buyers" in the nutrient trading market.

A recent analysis by RTI International found that these urban stormwater permitted entities in the Chesapeake Bay region could save hundreds of millions of dollars per year if they purchased credits in lieu of implementing retrofits to meet at least a portion of their pollution reduction targets. Details

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[1] Chesapeake Bay Restoration Act of 2000, Nov. 7, 2000, P.L. 106-457, Title II, § 202, 114 Stat. 1967

[2] Nutrient Credit Trading for the Chesapeake Bay: An Economic Study. Prepared for the Chesapeake Bay Commission by RTI International. May 2012.

can be found here: http://www.chesbay.us/Publications/nutrient-trading-2012.pdf. The results of this study are admittedly overly optimistic because it ignores barriers to trading such as farmer's willingness to participate, constraints on trading due to the need to address local water quality issues, and uncertainty in the market that can make both potential buyers and sellers reluctant to participate. Nonetheless, if only a fraction of these potential cost-savings are realized, permitees still could save millions of dollars.

Questions from Senator David Vitter:

1. In your written testimony, you state that for the Chesapeake Bay, the "most systemic problem continues to be an overload of nitrogen and phosphorus pollution creating a lack of dissolved oxygen in many parts of the Bay and its tributaries." Dr. Manley has submitted in his written testimony that nutrients are also "critical for ecosystem function at low levels." Where is the balance between these two ideas? Is that something that is best addressed by local entities rather than by EPA personnel in D.C.?

It is true that aquatic ecosystems need nutrients in order to function. These nutrients feed plants that are at the base of the food chain. The problem is that the Chesapeake Bay, most of its tidal rivers, and many aquatic systems through the U.S. and the world have nutrient loads that are far too high, largely the result of human activity. These excessive nutrient levels contribute to algae blooms, oxygen-deprived deadzones, and upset the functioning of a healthy aquatic ecosystem.

Under the Clean Water Act, a Total Maximum Daily Load (TMDL) sets limits for how much of a pollutant a waterway can receive and still meet water quality standards. These standards are set at levels to protect healthy ecosystems, therefore, the TMDL, in essence, establishes the balance between too much pollution and the maximum amount a waterway can receive, and still be healthy. Under the Clean Water Act, EPA frequently delegates the authority to develop TMDLs to the states, but still retains approval authority. In the case of the Chesapeake Bay "TMDL" (which actually includes roughly 92 tidal segments that are impaired for nitrogen, phosphorus and sediments), the watershed includes six states and the District of Columbia, so EPA took the lead on developing the multi-jurisdictional TMDL, in cooperation with the Bay jurisdictions. In fact, the Bay jurisdictions asked EPA to play this role. In June 2008, a committee of the Chesapeake Bay Program, which included cabinet members from each of the Bay jurisdictions, requested that EPA develop a Bay TMDL effective no later than December 31, 2010. http://www.chesapeakebay.net/S=0/calendar/event/13866/

2. You've indicated that it's important for agriculture to enter the nutrient trading market, and in order for this to happen farmers need to know "who has access [to] their farm data if they participate." Protecting confidential and private business data is important, although we have learned recently that EPA was all too willing to share this type of information with environmental groups. Was the Chesapeake Bay Foundation part of any effort to try to obtain

from EPA private and confidential business information on concentrated animal feeding operations (CAFOs)?

No, the Chesapeake Bay Foundation was not part of the effort to obtain information on CAFOs.

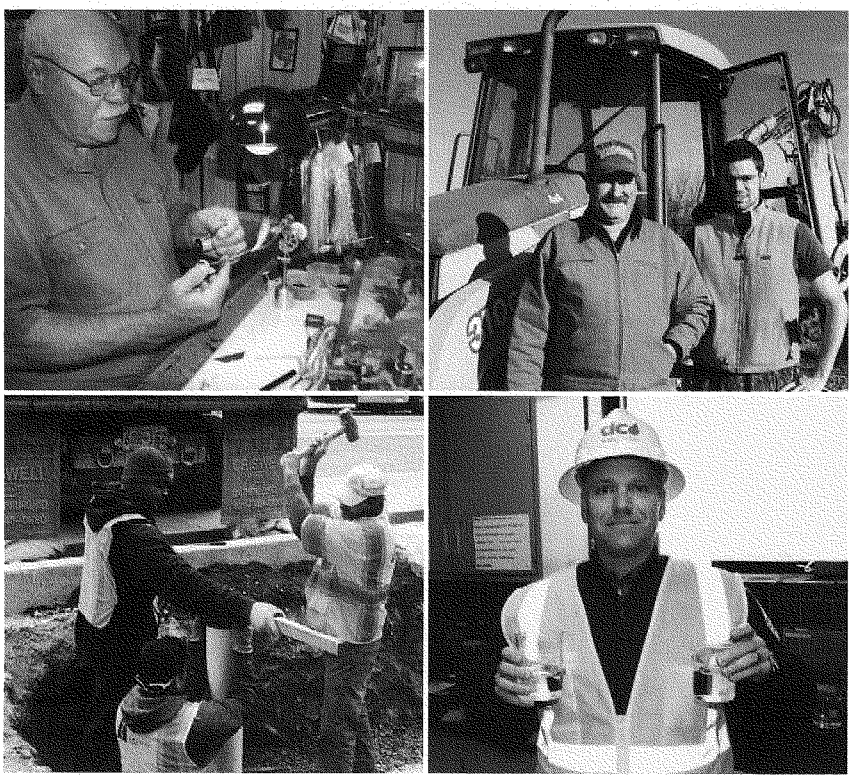
Questions from Senator John Boozman

1. Ms. McGee, you encouraged continued cooperation between EPA and USDA. What do you think should be done to encourage this cooperation?

Cooperation and collaboration between EPA and USDA is important to ensuring credit calculation tools and standards developed for agriculture conservation practices are consistent with Clean Water Act requirements. Congress could encourage this cooperation by regularly asking EPA and USDA to report on their collaborative efforts during agency oversight hearings.

CHESAPEAKE BAY FOUNDATION
Saving a National Treasure

REPORTS



The Economic Argument for Cleaning Up the Chesapeake Bay and its Rivers

CONTENTS

The Economic Argument for Cleaning Up the Chesapeake Bay and its Rivers

INTRODUCTION

The Chesapeake Bay is the largest and once most productive estuary in the United States. Its beauty is legendary. Congress has recognized it as a "national treasure and resource of worldwide significance."[1] Respected economists have valued it at over one trillion dollars related to fishing, tourism, property values, and shipping activities.[2, 3]

But the Bay and the rivers and streams in its six-state, 64,000-square-mile watershed are polluted, even listed on the Clean Water Act's "impaired waters" list. Indeed, the Chesapeake is a system grossly out of balance. Each of the 17 million (and growing) people who live in the Chesapeake's watershed pays the price. Human health is at risk, and jobs are lost. Iconic Bay wildlife is threatened in many cases.

Failure to "Save the Bay" threatens the Bay's value as an economic driver. Conversely, investing in clean-water technology creates jobs, generates economic activity, and saves money in the long run. Hence, the protection and restoration of the Chesapeake is essential for a healthy and vibrant regional economy.

Efforts to delay restoration of the Bay will only exacerbate the economic losses this region has already experienced due to poor water quality.

INVESTMENT IN CLEAN-WATER TECHNOLOGIES CREATES JOBS AND STIMULATES LOCAL ECONOMIES

According to the World Resources Institute, annual costs for clean air and water regulations issued by the U.S. Environmental Protection Agency (EPA) from October 1, 1999, to September 30, 2009, ranged from $26 to $29 billion, while benefits ranged from $82 to $533 billion.[4]

Currently, a clean water blueprint for the Chesapeake Bay and its rivers and streams is in place. The blueprint includes science-based pollution limits and the Bay states' plans to achieve them. In 2010, EPA established pollution limits (known legally as a Total Maximum Daily Load or TMDL) quantifying the amount of nitrogen, phosphorus, and sediment pollution the Bay could accommodate and still meet water-quality standards. EPA allocated specific numeric pollution-reduction targets for each of the six Bay states and the District of Columbia and established a 2025 goal for implementing programs to achieve those target reductions. Each of the jurisdictions has written its own unique plan (Watershed Implementation Plan or WIP) for how it will meet its targets. At this point in time, the jurisdictions are refining and beginning to implement their plans.

The plans call for investments in upgrades to wastewater treatment plants, improvements to stormwater and wastewater infrastructure, and implementation of agricultural conservation practices. These investments will all create local jobs and contribute to local economies.

INVESTMENT
$1 of water and sewer infrastructure investment increases private output (Gross Domestic Product) in the long term by $6.35.

For example, an analysis of the value of investing in water and sewer infrastructure concluded that these investments typically yield greater returns than most other types of public infrastructure.[5] A $1 investment in water and sewer infrastructure increases private output (Gross Domestic Product) in the long term by $6.35. Furthermore, adding a job in water and sewer creates 3.68 jobs to support that one.

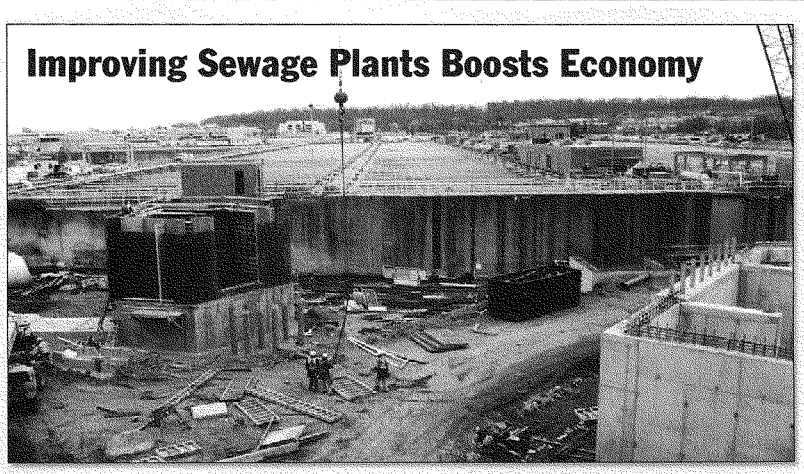
More specifically, upgrading sewage treatment plants and wastewater and stormwater infrastructure across the watershed has created hundreds of construction jobs, and will create thousands more as the program grows.[6] Also, upgrading individual septic systems has employed installers, electricians, and others involved in the business. These upgrades have pumped millions of dollars into the region's economy. A real-life example is Mayer Brothers, Inc., in Elkridge, Maryland.[7] This company staved off significant layoffs when it won a contract from the Maryland Department of the Environment (MDE) to help supply new septic technology throughout Maryland.

On the flip side, cuts to funding programs for clean-water infrastructure will lead to job losses. Carter B. McCamy says he would probably have to lay off over 20 workers from his Arbutus company if the Maryland legislature cuts the Chesapeake and Atlantic Coastal Bays Trust Fund.[8] The firm has received significant contracted work through the Trust Fund and employs 115 full-time workers and supports an additional 100 subcontractors who provide trucking materials, concrete, paving, and fencing required for stormwater mitigation projects.

Investments in agricultural conservation practices also lead to job creation and stimulate economic activity in rural communities. A study by the University of Virginia found that implementation of agricultural practices, such as livestock stream exclusion, buffers, and cover crops, would generate significant economic impacts.[9] Every $1 of state and/or federal funding invested in agricultural best management practices would generate $1.56 in economic activity in Virginia. Implementing agricultural practices in Virginia to the levels necessary to restore the Bay would create nearly 12,000 jobs of approximately one year's duration.

Furthermore, a recent poll in Virginia found that an overwhelming majority believe the state can protect water quality and still have a strong economy. Eighty percent of respondents agreed with the statement, "we can protect the water quality in rivers, creeks, and the Chesapeake Bay and have a strong economy with good jobs for Virginians, without having to choose one over the other." Of those

Improving Sewage Plants Boosts Economy



The District of Columbia Water and Sewer Authority is upgrading the largest sewer treatment plant in the Bay region. This will mean cleaner water (as shown by senior process engineer Nick Passarelli), and tens of thousands of jobs created.

Tens of thousands of jobs for engineers, laborers, computer technicians, and others are being created as part of more than $3 billion in construction projects at the largest sewage treatment plant in the Chesapeake Bay region.

Blue Plains Advanced Wastewater Treatment Plant in Washington, D.C., serves about two million people in the District of Columbia and suburban Maryland and Virginia. The plant releases 370 million gallons of effluent a day into the Potomac River and has a major impact on water quality.

To implement the clean water blueprint for the Chesapeake Bay and its rivers and streams, the District of Columbia Water and Sewer Authority is building an advanced nitrogen pollution removal system that will cut the amount of nitrogen the plant releases by 44 percent (or 3.7 million pounds annually) by 2014.

In addition, starting in August 2012, a caterpillar-shaped machine the length of a football field will begin digging a 13-mile-long sewage-control tunnel from Blue Plains under the Anacostia River and D.C.

The tunnel will be 23 feet wide—as big as a Metro tunnel. The massive tube will catch about three billion gallons a year of sewage mixed with stormwater that right now overflows into the Potomac and Anacostia Rivers during rain storms.

Previous upgrades at Blue Plains during the 1980s had a dramatic impact on water quality in the Potomac River, which went from being a national disgrace to the site of national bass fishing tournaments.

George Hawkins, General Manager of the District of Columbia Water and Sewer Authority, said the most recent round of upgrades will not only continue those improvements, but also boost the local economy.

"Tens of thousands of jobs will be created by this project, and there is also all the machinery and equipment that needs to be purchased—all the pipes, for example," Hawkins said. "So there will be a ripple effect of economic consequences even greater than just the people hired."

Each $1 billion invested in water and sewage projects can generate 20,000 jobs in construction, engineering, and manufacturing in a chain reaction that has a multiplier effect through the economy, according to a 2009 report by the Clean Water Council.

One of the people hired for the D.C. tunnel project is Chris Turner, a technician from Vienna, Virginia, who specializes in computer-assisted drafting and design. "I was out of work for almost two years before I got this job," said Turner, who works for Delon Hampton and Associates. "So I really appreciate being able to help with the project. I absolutely take pride in not just the paycheck, but also the knowledge that it is contributing to the environment."

Antoine Blair (above), a construction worker from Washington, D.C. was unemployed when he was hired to help DC Water improve its pollution control systems. "It's creating a lot of jobs," he said.

Antoine Blair, a construction worker from Washington, D.C., was out of work for two months when he was hired last August. "It was hard, trying to pay bills on unemployment," said Blair, a father of five who works as a laborer for Traylor Skanska Jay Dee Joint Venture. "This work came along at just the right time. It's creating a lot of jobs for people who really need it."

About 20,000 truckloads of concrete are being supplied for the project by Monumental Concrete, a minority-owned firm located near Blue Plains in Southwest D.C. that provides work to three employees and 20 contract workers.

"This is a major portion of our business right now. We are immeasurably thankful for it," said Pat Banks DeVeaux, an owner and manager of Monumental Concrete. "We are thrilled to be part of the solution to clean up D.C.'s waterways. To contribute to this project is something that is very close to my heart."

The Blue Plains construction project is also a showcase for technological innovation. DC Water is investing more than $400 million to build a renewable energy system called a thermal hydrolysis digester that will extract methane from the solid waste that is left over after the sewage is filtered.

This methane will be burned in generators to create 13 megawatts of electricity—nicknamed "people power"—enough to light 10,000 homes, said Chris Peot, a manager at DC Water. The agency will use the electricity to save about $10 million to $20 million a year in electric bills.

"What people are sending down the pipes to us is valuable, and we can convert it to clean-green renewable energy," Peot said.

The digester will reduce by half the 60 truckloads of solid waste a day coming out of the sewage plant, and this will mean less land filled or spread on fields as fertilizer, Peot said. The reduction could also save ratepayers $10 million a year in hauling costs.

"What people are sending down the pipes to us is valuable, and we can convert it to clean-green renewable energy."

Chris Peot,
Manager at DC Water

polled, 92 percent believe the Bay is "important for Virginia's economy." Implementation of the clean water blueprint for the Chesapeake Bay and its rivers and streams will result in clean water, a healthy Bay, and a strong regional economy.

THE CHESAPEAKE BAY SUPPORTS ECONOMICALLY AND ECOLOGICALLY IMPORTANT COMMERCIAL AND RECREATIONAL FISHERIES

The Chesapeake's fisheries industry, including both shellfish and finfish, is a significant part of the region's local economy. The 2009 Fisheries Economics of the U.S. Report by the National Oceanic and Atmospheric Administration (NOAA) indicates that the commercial seafood industry in Maryland and Virginia contributed $3.39 billion in sales, $890 million in income, and almost 34,000 jobs to the local economy.[10]

The annual economic benefits of saltwater recreational fishing are equally impressive, contributing $1.34 billion in sales that in turn contributed almost $700 million of additional economic activity and roughly 11,000 jobs.[11] The majority (90-98 percent) of the commercial and recreational saltwater landings in the Mid-Atlantic region come from the Chesapeake Bay.[12]

FISHERIES
The 2009 Fisheries Economics of the U.S. report by the National Oceanic and Atmospheric Administration (NOAA) indicates that the commercial seafood industry in Maryland and Virginia contributed $3.39 billion in sales, $890 million in income, and almost 34,000 jobs to the local economy.

Crabs

Arguably no other creature exemplifies the Chesapeake Bay better than the blue crab, *Callinectes sapidus*. For more than a half century, the blue crab has been the most iconic of the Bay's commercial fisheries. Over one-third of the nation's blue crab harvest comes from the Bay. The average annual commercial harvest in Maryland and Virginia between 2000 and 2009 was over 55 million pounds.[13] The dockside value of the blue crab harvest Bay-wide in 2009 was approximately $78 million.[14] The recreational crab fishery also provides a significant financial offset for Bay residents—the cost of catching crabs is far less than having to buy them.

Oysters

Another critical Bay species, commercially, recreationally, and ecologically, is the American oyster, *Crassostrea virginica*. From the late 1800s to the mid-1900s, the commercial oyster industry employed thousands of people in the Bay region catching, selling, shucking, and shipping oysters to market. Hundreds of skipjacks—sail-powered dredge boats—plied the waters of the Bay in search of the delectable oyster. The industry generated millions of dollars a year for the Bay economy. Until the mid-1980s, oysters supported the leading commercial

The decline of the Bay oyster has been a huge economic loss for Maryland and Virginia.

fishery in the Bay.[15] Like the blue crab, Chesapeake oysters spawned a rich cultural heritage.

In addition to their commercial and recreational value, oysters improve water quality because they are filter feeders. An individual adult oyster can pump over 50 gallons of water a day through its gills, which strain out food and pollutants: chemicals, nitrogen, phosphorus, and sediment. In addition, oyster reefs provide valuable habitat for countless Bay creatures—most notably finfish—and serve as popular fishing areas. In 2010 the harvest of over one million pounds of oysters from the Chesapeake was valued at $9.4 million.[16]

Rockfish

Rockfish or striped bass, *Morone saxatilis*, has been and remains the most popular commercial and recreational finfish in the Bay, generating roughly $500 million of economic activity related to fishing expenditures, travel, lodging, etc. per year.[17]

EACH OF THESE CRITICAL FISHERIES HAS BEEN DEGRADED BY POOR WATER QUALITY WITH SIGNIFICANT RESULTING ECONOMIC LOSSES

The economic losses associated with the decline in fisheries resources in the Bay are substantial. Between 1994 and 2004, the value of Virginia's seafood harvest decreased by 30 percent[18] with Maryland's commercial landings exhibiting a similar decline during that time.[19] Jobs declined as well. In 1974 there were 136 oyster shucking houses, today only about half a dozen remain.[20]

Crabs

For the last three years, the Chesapeake Bay blue crab population has been on the rebound, thanks in large part to aggressive management measures; however, prior to this, the overall crab trend since the 1990s had been a decrease in landings despite increased crabbing efforts.[21]

In addition, the number of crabs one year and older had dropped from 276 million in 1990 to 131 million in 2008.[22] When the broader impact on restaurants, crab processors, wholesalers, grocers, and watermen is added up, the decline of crabs in the Bay has meant a cumulative loss to Maryland and Virginia of about $640 million between 1998 and 2006.[23]

As a result of the low population level, in 2008, Maryland and Virginia issued severe crabbing restrictions, in an attempt to restore the population. These restrictions placed severe economic hardship on Chesapeake Bay crabbers. In

Controlling Polluted Runoff Creates Local Jobs

Steve Shofar (center), Chief of Montgomery County's Watershed Management Division, is helping to direct the $305 million effort. The Maryland county is hiring about 3,300 workers to improve its stormwater control systems. The workers include Marcus Irving (below, left).

While many cities and counties are wrestling with how to achieve the science-based pollution limits, Montgomery County, Maryland, is roaring ahead with construction projects that are both controlling runoff and creating jobs.

Polluted runoff from suburban and urban areas is the fastest growing source of pollution in the Chesapeake Bay, according to the U.S. Environmental Protection Agency (EPA).

Montgomery County plans to spend $305 million and employ roughly 3,300 construction workers over the next three and a half years building a network of stormwater pollution control devices, according to Montgomery County's Watershed Management Division.

The projects include stream restoration projects, green roofs, stormwater containment ponds, and roadside runoff control structures. Montgomery County already has constructed a few of these projects, and plans to build hundreds more as it works toward implementing the clean water blueprint for the Chesapeake Bay and its rivers and streams.

"Especially in urban areas like Montgomery County, there are a lot of impervious surfaces (blacktop and roofs) that generate a lot of stormwater," said Steve Shofar, Chief of Montomgery County's Watershed Management Division. "And that stormwater picks up dirt, sediment, grease, lawn fertilizer, and other things—so you need to treat and filter the water to keep the pollution out of streams that lead to the Chesapeake Bay."

Stormwater control projects like Montgomery County's could create roughly 36,000 temporary construction jobs across Maryland over the next five years, as well as 10,000 jobs in the District of Columbia, 80,000 jobs in Pennsylvania, and 52,000 jobs in Virginia, according to a report called "Water Works" that was released in October 2011 by the Economic Policy Institute and partners.

The stormwater control projects in Montgomery County are being funded through an annual $70.50 stormwater fee on the property tax bills of local residents. Until re-

cently, only a few local governments in the Bay watershed—including Washington, D.C.; Takoma Park; Rockville; Annapolis; and Richmond—have such fees or aggressive policies for managing stormwater, according to EPA. The good news is that this is changing. In its 2012 legislative session, Maryland passed a bill that will require the state's nine most populous counties and Baltimore to begin collecting stormwater fees of their choice by July 1, 2013.

Marcus Irving, a worker at Highway and Safety Services, Inc., was unemployed before being hired to help build stormwater control systems for Montgomery County.

"It's a key priority of the Environmental Protection Agency and the Bay states to get a better handle on what we call wet-weather pollution, or stormwater pollution," said Jon Capacasa, Director of the Water Protection Division for EPA Region III. "Clearly, Montgomery County, Maryland, is one of the leaders in meeting the challenge."

A February 2010 stormwater control permit approved by the Maryland Department of the Environment requires Montgomery County to rebuild or add stormwater pollution devices to 20 percent of its impervious surfaces, such as blacktop and roofs. That means about 4,300 acres.

The county is also building cutting-edge stormwater control devices called "bump outs," which are patterned after a system pioneered in Portland, Oregon. These devices, which cost from $30,000 to $50,000 each, are built a few feet out into the parking lane of a roadway, with openings at both ends to collect runoff that gurgles down a gutter.

Plants growing in a bump-out's ditch-like indentation absorb pollution, while small dams slow the flow of water. A gravel bed and perforated pipes under the ditch allows water to seep down into the ground.

Mike Peny, Construction Division Manager for Angler Environmental, said his company boosted its employment by 12 percent this year, hiring 10 workers just to keep up with Montgomery County's efforts to implement the clean water blueprint for the Chesapeake Bay and its rivers and meet the terms of its state stormwater permit.

Peny said the clean water blueprint for the Chesapeake Bay and its rivers and streams has been nothing but a help for his company. "This really creates jobs for us," Peny said, as he stood beside a once-eroded stream called Booze Creek in Montgomery County that his company rebuilt. "These types of projects are what drive our ability to hire and stay in business."

One of the laborers hired to build roadside stormwater control devices in Montgomery County is Marcus Irving, who works for Highway and Safety Services, Inc. "Before I got this job two months ago, I was out of work for eight months," said Irving, a 34-year-old father of two from Montomery County.

He said he had been laid off from a job laying cable for a television cable company. "It was extremely tough, living day to day, basically," Irving recalled. "But then this job opportunity became available, and it was a blessing. It's a beautiful thing for me to be working again, feeling like an adult again, and putting food on the table for my family."

"It's a beautiful thing for me to be working again, feeling like an adult again, and putting food on the table for my family."

Marcus Irving,
Highway and Safety Services, Inc.
Worker

response, members of Congress from Maryland and Virginia requested federal disaster relief for Bay crab fishermen. In September 2008, the Secretary of Commerce determined that the Chesapeake Bay soft shell blue crab fishery had undergone a commercial failure as defined under the Magnuson-Stevens Fishery Conservation and Management Act (16 USC § 1861). In January 2009, the Department of Commerce allocated $10 million of disaster relief to each state.[24]

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Until water quality improves, the blue crab population will not fully recover.

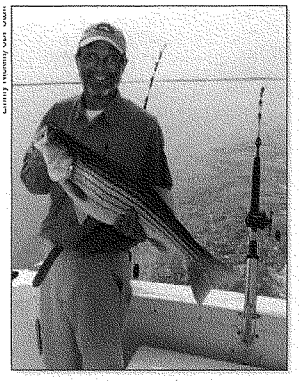
Because of the restrictions on catching female crabs imposed by Virginia and Maryland in 2008, the estimated number of blue crabs in the Bay nearly tripled between 2007 and 2011, rising to 764 million in 2011.[25] Nonetheless, scientists believe that poor water quality may be limiting crab populations in the Chesapeake Bay. On average, over the last 10 years, more than 75 percent of the Chesapeake Bay and its tidal rivers have had insufficient levels of dissolved oxygen.[26] Low oxygen levels drive blue crabs from their preferred habitat and kill many of the small bottom organisms on which they feed.[27] The low dissolved oxygen conditions caused by nitrogen and phosphorus pollution are the primary reason large sections of the Bay have become unsuitable as blue crab habitat. A study by the University of Maryland confirms that decreases in dissolved oxygen can reduce crab harvests and revenue to watermen.[28]

Poor water clarity also has hurt crab populations. This pollution-driven problem has reduced the acreage of underwater grasses necessary to protect juvenile crabs, molting crabs, and adult crabs from predation. Studies have shown that crabs living in areas with little or no coverage of underwater grasses suffer higher mortality.[29] Water clarity in the Bay has been decreasing since the 1990s and in 2009, only 26 percent of it had acceptable water clarity.

The conclusion is clear. Until water quality improves, the blue crab population will not fully recover.[30]

Oysters

A combination of overharvesting, disease, and pollution has decimated the oyster population in the Chesapeake Bay. Silt washed by rain from urban areas and agricultural fields can bury oyster beds, particularly those that have been flattened by dredges.[31] Extended periods of zero-oxygen conditions can be fatal to oysters.[32] In addition, recent studies have indicated that low oxygen levels can stress the oysters' immune systems, making them more susceptible to disease.[33] Pollution has also resulted in the closure of shellfish beds to commercial harvesting. Threats from sewage and bacteria forced Maryland and Virginia to close or restrict oyster harvesting in 223,864 acres of the Bay and its tributaries in 2008,



Emily Hoenig/CBF Staff

The rockfish, or striped bass, is the most popular commercial and recreational finfish in the Bay.

about eight percent of the total shellfish beds.[34] The decline of the Bay oyster over the last 30 years has meant a loss of more than $4 billion for Maryland and Virginia.[35]

Rockfish

Faced with a catastrophic collapse in the fishery, Maryland banned commercial and recreational fishing for rockfish in its portion of the Bay from 1985-90, and Virginia followed suit with a one-year moratorium in 1989.[36] The dramatic decline of the population was due to several factors, including heavy overfishing and low dissolved oxygen in many parts of the Bay. Today, the rockfish population is at its highest in decades because of tight catch restrictions. However, scientists are concerned about high prevalence of the usually fatal wasting disease Mycobacteriosis. The fishes' current susceptibility to it appears to come from environmental stress generated by poor water quality and limited availability of preferred prey.[37]

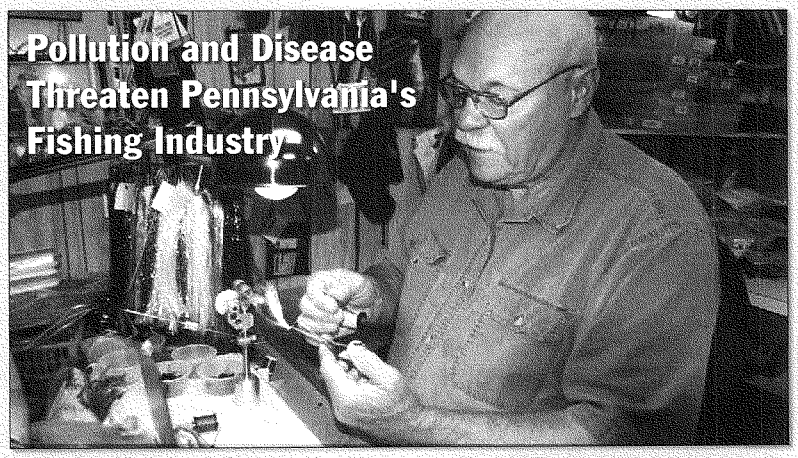
Studies by Lipton and Hicks[38,39] have estimated the impact of dissolved oxygen on rockfish catch rates in the Chesapeake Bay, as well as the impact of higher catch rates on the value of a fishing day. They found that a 2.4 mg/L improvement in dissolved oxygen could increase striped bass catch rates by 95 percent. Furthermore, the value of catching more fish was roughly $11 per trip (in 2007 dollars).

THESE ECONOMIC LOSSES ARE NOT RESTRICTED TO THE TIDAL REGIONS OF THE BAY WATERSHED

According to the Pennsylvania Fish and Boat Commission (PFBC), nearly two million people go fishing in Pennsylvania each year, contributing over $1.6 billion to the economy. Among the most popular fish for anglers are warmwater species, especially smallmouth bass, and coldwater species, especially native brook trout. On January 1, 2012, PFBC enacted a mandate for total catch-and-release of smallmouth bass in certain areas of the Susquehanna River and bans it completely between May 1 and June 15 in parts of the river because of population declines associated with water-quality problems. Degraded stream habitat has restricted the Pennsylvania brook trout to a small fraction of its historical distribution.

Virginia, and to a lesser extent Maryland, also support significant freshwater recreational fisheries, with roughly one million anglers participating and contributing millions to local economies.[40] By way of example, a fish kill in the Shenandoah River watershed in 2005—likely caused in part by poor water quality—resulted in roughly a $700,000 loss in retail sales and revenues.[41]

Pollution and Disease Threaten Pennsylvania's Fishing Industry



Bob Clouser (above) is a legend among makers of fishing flies. But he no longer works as a guide on the Susquehanna River because of fish kills.

Near the Susquehanna River in Middletown, Pennsylvania, a handmade sign hangs on a small, vinyl-sided home, reading: "Clouser's Fly Shop."

Inside, Bob Clouser grips a fish hook and delicately ties thread through tiny black eyes and a golden tail. It's one of his famous Clouser Minnows, crafted by hand with animal hair.

Clouser makes a living selling flies to fishermen around the world. But he no longer works as a fishing guide in the Susquehanna River because of repeated fish kills that scientists suspect may be linked to water pollution.

"When I was a kid, the water sparkled, clear," Clouser recalled as he assembled flies at a brightly lit desk lined with spools of colored thread. "There were layers and layers of blue damselflies across that river, dancing all day long. Today, the water has a still, dead look, and you can't even see in six inches of water."

His fishing guide business closed because of fish kills that devastated the river in 2005, 2007, 2008, and 2012. Scientists believe that baby bass in the Susquehanna River have lost their resistances to disease and they are investigating possible links to pollutants, according to Geoffrey Smith, a biologist with the Pennsylvania Fish and Boat Commission (PFBC). With little resistance to disease, bacteria in the water that are normally harmless are killing the fish.

The commission is banning fishing for smallmouth in much of the Susquehanna from May 1 to June 15, 2012, to help the fish recover.

The end of Clouser's career as a fishing guide and the banning of smallmouth bass fishing are examples of the economic damage that can be caused by poor water quality. They also illustrate why federal and state funding and support of the clean water blueprint for the Chesapeake Bay and its rivers streams are critical for the repair of the region's economic engine.

Nearly two million people a year go fishing in Pennsylvania, contributing over $1.6 billion to the economy. But water pollution has restricted fishing in many streams. And since 1990, the number of fishing licenses sold in the state has dropped by 31 percent, from 1,163,758 in 1990 to 806,159 in 2011, state figures show.

Freshwater recreational fishing is also popular in Maryland and Virginia, with about one million anglers in these states contributing millions of dollars to local economies, according to the U.S. Fish and Wildlife Service. If commercial fishing is taken into account, the seafood industry contributes about $2 billion in sales annually and more than 41,000 jobs to the regional economy, the National Oceanic and Atmospheric Administration (NOAA) reports.

Photoxpress

Nearly two million people a year go fishing in Pennsylvania.

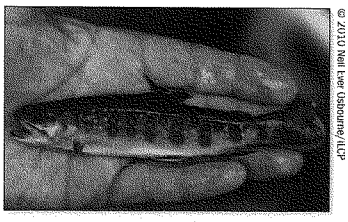
Although nobody knows for sure what is killing the fish in the Susquehanna, Clouser knows one thing. The river he inherited from his father—the cascading ribbon, full of life, which flows from the forests of upstate New York to the Chesapeake Bay—will not be there for his children or grandchildren unless we reduce pollution.

"We need to get the Susquehanna River cleaned up and the Chesapeake Bay cleaned up," Clouser said. "Every one of my kids loved fishing. But today, I have no grandchildren who like to fish. They are bored because they can catch no fish."

"When I was a kid, the water sparkled, clear... Today, the water has a still, dead look, and you can't even see in six inches of water."

Bob Clouser, Owner of Clouser's Fly Shop

A 2001 study compared the 1996 water quality of the Bay with what it would have been without the Clean Water Act. Results indicated that benefits of water-quality improvements to annual recreational boating, fishing, and swimming ranged from $357.9 million to $1.8 billion.[42] Fisheries declines since the 1990s indicate that early progress reducing pollution hasn't been sustained. We must reverse this trend. If pollution to the Bay is left unabated, we will see continued decline of the region's fisheries and the resulting economic impacts.



Fishing in Pennsylvania contributes over $1.6 billion to the economy.

POLLUTED WATERS ALSO HURT PUBLIC HEALTH AND LOCAL ECONOMIES

Unhealthy waters increase public health burdens associated with consuming tainted fish or shellfish and exposure to waterborne infectious disease while recreating. One study estimated the cost associated with exposure to polluted recreational marine waters to be $37 per gastrointestinal illness, $38 per ear ailment, and $27 per eye ailment due to lost wages and medical care.[43]

Furthermore, although closing a beach is meant to prevent illness, it directly and indirectly results in an economic loss for local businesses and the county where the beach is located. A National Oceanic and Atmospheric Administration (NOAA) study indicated that a one-day beach closure in Huntington Beach, California, was expected to result in thousands of dollars of lost income for local communities.[44] There are hundreds of beach closures in the Bay region each year,[45] potentially resulting in hundreds of thousands of dollars of lost income for local economies.

NATURE-BASED RECREATION—SUCH AS WILDLIFE WATCHING, ECOTOURISM, AND BOATING THAT ARE DEPENDENT ON CLEAN WATER—IS A VITAL ECONOMIC DRIVER FOR THE BAY REGION

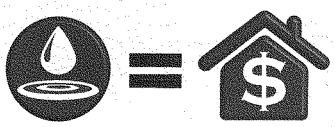
Roughly eight million wildlife watchers spent $636 million, $960 million, and $1.4 billion in Maryland, Virginia, and Pennsylvania, respectively, in 2006 on trip-related expenses and equipment.[46] These estimates do not include other economic benefits of these expenditures, such as job creation and the multiplier effect on local economies. Improvements to water quality through land preservation, reforestation, and wetlands restoration will increase and enhance wildlife populations. A study of the Great Lakes indicates there would be substantial improvement in wildlife-watching opportunities and associated economic benefits by improvements to wildlife habitat.[47]

Recreational boating is also a strong economic driver in Maryland, Pennsylvania, and Virginia. The total impact on the Maryland economy from recreational boating is estimated to be about $2.03 billion and 35,025 jobs annually.[48] Similarly, Pennsylvania residents spend $1.7 billion on boating annually. The average expenditure per recreational boater each year is $274. Of this amount, roughly $113 is spent in direct boating-related expenses and $161 is spent on trip-related expenses, including: auto fuel, meals, lodging, and admission/entrance fees.[49]

A recent study in Hampton, Virginia, found that resident and non-resident boaters were responsible for $55 million in economic benefit annually representing $32.5 million in new value added, $22.5 million in incomes, and 698 jobs.[50] The majority of expenditures were spent by out-of-region boating visitors, so they represent an inflow of "new" capital to the community. The study also indicated that "water quality, fishing quality, and other environmental factors" ranked among the most important influences on a boater's decision of where to keep his or her boat.

CLEAN WATERWAYS INCREASE PROPERTY VALUES

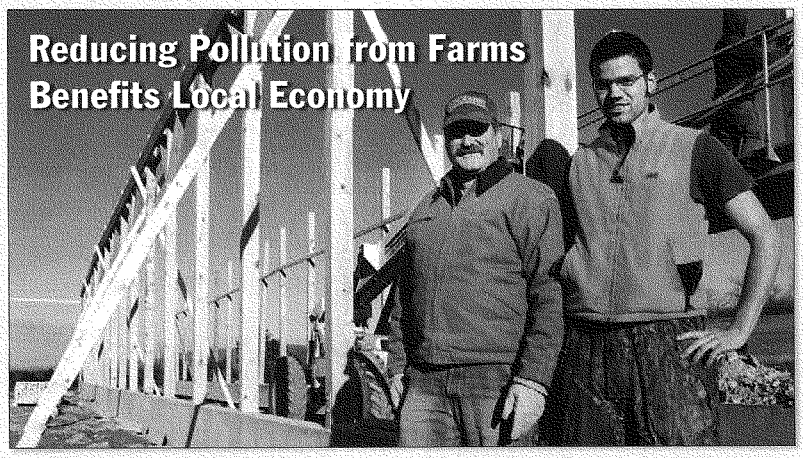
A U.S. Environmental Protection Agency (EPA) study indicated that clean water can increase the value of single family homes up to 4,000 feet from the water's edge by up to 25 percent.[51] A 2000 study concluded that improvements in water quality along Maryland's western shore to levels that meet state bacteria standards could raise property values six percent.[52] A study conducted on home sales in St. Mary's County, Maryland, between 1999 and 2003 indicated that property values increased with decreases in nitrogen concentrations and suspended sediments in nearby waterways.[53] Homes situated near seven California stream restoration projects had three to 13 percent higher property values than similar homes located on damaged streams.[54] A study by the Brookings Institute projected a 10 percent increase in property values for homes that would abut a proposed $26 billion Great Lakes restoration project.[55] The City of Philadelphia estimates that installation of green stormwater infrastructure in the city will raise property values two to five percent, generating $390 million over the next 40 years in increased values for homes near green spaces.[56]



PROPERTY VALUES
An EPA study indicated that clean water can increase the value of single family homes up to 4,000 feet from the shoreline by up to 25 percent.

POLLUTION REDUCTIONS LOWER DRINKING WATER AND OTHER UTILITY COSTS

Reducing pollution inputs from pipes and land-based sources can reduce locality costs to treat drinking water sources to safe standards. New York City's expendi-



Reducing Pollution from Farms Benefits Local Economy

Virginia cattle farmers Dan and Quentin King (top photo, left and right) are implementing practices to reduce pollution from their farm.

Wayne Mitchell (bottom) is one of 10 workers helping to improve the farm.

Feeding cattle can be a muddy business on the rolling hillsides of Virginia's Shenandoah Valley.

On Dan King's farm north of Harrisonburg, 180 cows rip up the grass as they cluster around feeders holding hay. Rain washes the loose dirt, mixed with manure, downhill into a pond. During large storms, the pond sometimes overflows into a stream bed that flows toward the Shenandoah River and eventually the Chesapeake Bay.

When the cows drink, they wade into the pond, creating a potential health threat for their nursing calves, said King, a 54-year-old farmer who runs a 500-acre beef and poultry operation with his son Quentin.

"If the cattle stomp in there and get their udders covered with mud and animal waste, they can get a disease called mastitis," an infection of the udders, King explained.

King is tackling the problem with a series of projects that will reduce erosion and runoff pollution, improving water quality and the efficiency of his business, the health of his animals—and the health of the Chesapeake Bay.

He is constructing four open barn-like buildings in which his cattle will be fed on concrete pads before they return to the hillsides to graze. Nearby, he is also building manure storage facilities to contain runoff until it can be spread on fields as fertilizer.

Builders are also installing more than a half-mile of fences to keep his cows out of the pond. Four automatic water-dispensing devices in the fields provide an alternative clean water supply for the cattle, so they don't have to wade into the pond to drink.

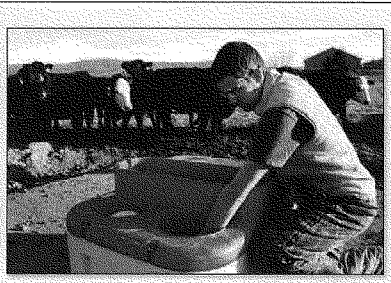
"The farm was an environmental nightmare when we bought it," King said. "We have been able to do a lot of things to reduce runoff on the farm. Our goal is to stabilize the soil, and keep it here on the farm, to prevent it from being a part of the 'chocolate milk' of silt that runs into the Bay during storms."

The $300,000 in improvements on King's farm will save him and his son labor and time by making it easier to feed the livestock. Keeping the cattle out of the ponds will likely also reduce veterinary bills.

About 70 percent of the project is being funded through a federal program run by the Natural Resources Conservation Service. The rest King is paying for through a low-interest loan.

The project is providing a lift to the local economy, because it requires the hiring of 10 workers, including construction workers, an excavator, and fence builders.

"These farm projects have really helped me out a lot in a down time," said Wayne Mitchell, owner of D & D Excavating, which performed grading work for King's new buildings. "Other construction work has been very slow. But this has kept me working."



Farmer Quentin King demonstrates a new cattle watering device installed recently so that his animals don't have to drink out of a muddy pond.

King purchased the cattle watering devices and plumbing from the May Supply Company of Harrisonburg, Virginia. Sales Manager, Mike Heatwole, said his company sold 350 similar fountains in Virginia last year, about 65 percent of them for farm runoff-control projects.

"These farm conservation programs drive a large portion of our sales, and have definitely helped to keep us afloat," Heatwole said. "This part of our business has gone up, while housing construction went down."

A 2010 study by the University of Virginia concluded that the equivalent of 11,751 temporary jobs lasting one year each would be created if the state and federal governments invested $804 million in farm conservation projects like the one on King's farm.

Projects that reduce farm runoff to implement the clean water blueprint for the Chesapeake Bay and its rivers and streams are producing a chain reaction through the economy.

Conservation Services Inc., of Verona, Virginia, plants trees along streams and takes other steps to reduce runoff. Jeff Brower, Vice President of the firm, said the company has grown from two employees to seven—and is now looking to hire an eighth.

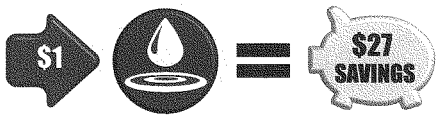
"We are not just planting trees—we are buying all the products that we need for (runoff-control projects)," Brower said. "For example, we buy 300,000 oak stakes a year from saw mills in Pennsylvania and Virginia. We buy 300,000 plastic tubes a year to protect the saplings we plant from deer and other animals."

The company he buys these tree-sheltering tubes from is Fiberweb of Old Hickory, Tennessee. "The bulk of our business goes toward reducing agricultural runoff," said David Bogue, Sales Manager for Fiberweb. "My job is dependent on clean water. It's a good business to be in, because you are accomplishing something so much more than a paycheck."

"My job is dependent on clean water. It's a good business to be in because you are accomplishing something so much more than a paycheck."

David Bogue, Sales Manager for Fiberweb

ture of $1 billion over the last decade to protect the watersheds north of the city that supply its drinking water avoided the need to build a $6 billion treatment plant.[57] An EPA study of drinking water source protection efforts concluded that every $1 spent on source-water protection saved an average of $27 in water treatment costs.[58] Similarly, a study by the Brookings Institute suggested that a one percent decrease in sediment loading will lead to a 0.05 percent reduction in water-treatment costs.[59]



UTILITY COSTS
An EPA study of drinking water source protection efforts oncluded that every $1 spent on source-water protection saved an average of $27 in water treatment costs.

Proactive efforts to lessen stormwater flows today reduce future public costs needed to maintain navigation channels, remediate pollution and hazard flooding, and repair infrastructure and property damage caused by excessive runoff. Philadelphia estimates that after 40 years, their installation of green infrastructure will create more than $2 in benefits for every dollar invested, generating $500 million in economic benefits, $1.3 billion in social benefits, and $400 million in environmental benefits.[60]

CONCLUSION

2012 is the moment in time for the Chesapeake Bay. With a clean-water blueprint for the Chesapeake Bay and its rivers and streams in place and the states working hard to refine and implement their plans to achieve specific pollution-reduction targets, restoration is in sight.

Saving the Bay and restoring clean water will not just benefit us; it will benefit our children, future generations, and iconic Bay wildlife. Investing in the Chesapeake will pay tremendous economic returns too. Conversely, if we do not keep making progress, we will continue to have polluted water, human health hazards, and lost jobs—at a huge cost to society.

Efforts to delay implementation of the clean water blueprint for the Chesapeake Bay and its rivers and streams, therefore, will only exacerbate the economic impacts this region has already experienced due to poor water quality.

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HOW THIS REPORT WAS COMPILED

Chesapeake Bay Foundation scientists reviewed and integrated information from published studies and reports. CBF Senior Writer and Investigative Reporter Tom Pelton wrote the spotlights based on data he received from state and federal environmental agencies; reviewed published studies and reports; and interviewed economics experts, as well as business owners and workers.

CHESAPEAKE BAY FOUNDATION
Saving a National Treasure

Maryland
Philip Merrill Environmental Center
6 Herndon Avenue
Annapolis, MD 21403
410/268-8816
410/269-0481 (from Baltimore metro)
301/261-2350 (from D.C. metro)

Pennsylvania
The Old Water Works Building
614 North Front Street, Suite G
Harrisburg, PA 17101
717/234-5550

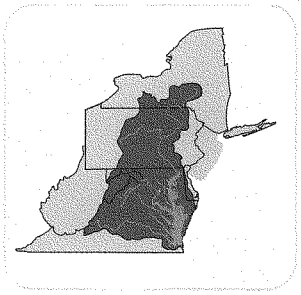
Virginia
Capitol Place
1108 East Main Street, Suite 1600
Richmond, VA 23219
804/780-1392

Hampton Roads
142 West York Street, Suite 618
Norfolk, VA 23510
757/622-1964

Washington, D.C.
725 8th Street, SE
Washington, DC 20003
202/544-2232

Web site: cbf.org
E-mail: chesapeake@cbf.org
Membership information: 888/SAVEBAY

CHESAPEAKE BAY WATERSHED



The Chesapeake Bay's 64,000-square-mile watershed covers parts of six states and is home to more than 17 million people.

All photos taken by Tom Pelton/CBF Staff, unless otherwise noted.
Graphics by Jill BeVier Allen/CBF Staff.

May 2012

Senator CARDIN. Thank you, Dr. McGee.
Mr. Hawkins, welcome back to the Committee.

STATEMENT OF GEORGE HAWKINS, GENERAL MANAGER, D.C. WATER

Mr. HAWKINS. Good afternoon, Chairman Cardin, Ranking Member Boozman. My name is George Hawkins. It is a delight to be back before you again to speak about nutrient trading.

I have the honor and pleasure of being the General Manager of D.C. Water, which among other things, like responding to a sinkhole at 14th and F this morning, runs the Blue Plains Advanced Wastewater Treatment Plant, which is the largest advanced wastewater treatment plant on Earth.

I sit before you fundamentally because of a remarkable success. It is the success of the point source discharge program under the 1972 Clean Water Act Amendments that has generated the need for today's hearing. That success risks failure today, or what I would say is grasping defeat from the jaws of victory. Let me put the point in very clear terms. Take nitrogen removal, what we are speaking of today. Blue Plains, the largest facility in the Country doing this kind of work, which serves both the District, 70 percent of Montgomery County, Prince George's County in Maryland, Fairfax, Loudon and Arlington County in Virginia, removed nutrients from 14 milligrams per liter to 7.5 milligrams per liter up to the year 2000. That is equivalent to 7.3 million pounds of nutrients for a cost, remarkably small, of $16 million.

The next phase of our reductions was for 7.5 milligrams per liter to 5 milligrams per liter. So now two and a half additional milligrams per liter, for $130 million. So one-third the level of protection for 10 times the price.

What we are currently undertaking at Blue Plains is reducing nutrients one more milligram per liter, 1.1 actually, from 5 milligrams per liter to 3.9. That is equivalent to 1.2 million pounds of nutrients in a year, at the cost of $1 billion. Let me say that again, $1 billion. The price of removing a pound of nutrients at Blue Plains has risen 600 times since we started this work originally. That by itself should justify a look at what is most economically efficient.

If you compare the sources for nutrients to the Chesapeake Bay by State, the District of Columbia is 1 percent of the nutrient load to the Chesapeake Bay. If you do it by source, agriculture, runoff from land and air deposition is 80 percent of the nutrient load to the Bay. Blue Plains, the largest single point source, is 2 percent.

Put these numbers in comparison, the billion dollars we are spending currently at Blue Plains is allocated between the District of Columbia, Maryland and Virginia. In fact, because of flows coming to the plant, 60 percent is borne by constituents in Maryland and Virginia, including some of yours, Senator, perhaps yourself, and 40 percent is borne by District residents, which together is just about 2 percent of the nutrient source for the Bay.

So that means $400 million is being spent by D.C. ratepayers today, now, to reduce less than 1 percent of the nutrients to the Bay, and $600 million, because a larger percentage of the flow comes from our suburban customers, are paying for slightly more

than 1 percent, totaling 2 percent. And I don't have the facts in front of me, but you compare the expenditure of our ratepayers, hundreds of millions of dollars, to reduce less than 1 percent in each case of the nutrients to the Bay, and it raises three fundamental questions.

First in equity, I just finished the eight rate hearings I do in the District regarding our rate increases. I had to have police officers go with me to a number of them. Because the rates have gone so high for our ratepayers, many of whom are fixed income, low income, unemployed from throughout the city. Costs to urban ratepayers are not conjecture, they are not perhaps in the future, they are not requirements that might come to a farm someday, they are right now, and they are enormous. Our rates have doubled over the last 4 years.

Second is economic. The rate curve that we are on and the cost of reducing at Blue Plains is so great that we are spending a billion dollars of public funds for such a small outcome. On a straight economic basis is that a rational expenditure of public funds?

And third, is it a sound investment fundamentally on an environmental basis? Blue Plains is 2 percent of the source to the Chesapeake Bay. We are spending a billion dollars to remove a fraction of that 2 percent. Our engineers do not know how we would get to zero discharge, but they tell me with enough money they could do it. But the question of whether or not, if we did get to zero, 98 percent of the source of nutrients to the Chesapeake Bay would still exist despite that enormous expenditure.

So the notion, would Blue Plains and D.C. Water be interested in a trading program where we could get better reductions at lower costs? Absolutely yes. Every question here that has been asked is a legitimate one. We would want certainty to know that we are not going to have ratcheted down in the future what we paid in the short run.

And the second is that we want to know everybody has skin in the game. If D.C. ratepayers have spent hundreds of millions of dollars in reductions, even if it is less expensive than the next treatment increment at D.C. Water, spending money to reduce someone else's pollutants on top of it if they don't also have skin in the game would be a challenge to sell to our ratepayers here at home.

Nonetheless, I think the economic, environmental and equitable potential of trading I think requires that it be on the agenda and why this hearing is exactly the right step today. Thanks very much.

[The prepared statement of Mr. Hawkins follows:]

UNITED STATES SENATE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

SUBCOMMITTEE ON WILDLIFE AND ENVIRONMENT

TESTIMONY OF GEORGE S. HAWKINS, ESQ.

GENERAL MANAGER

DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY

WEDNESDAY MAY 22, 2012 AT 2:30 P.M.

DIRKSEN SENATE OFFICE BUILDING, ROOM 406

Introduction

Good afternoon, Chairman Cardin and members of the Committee on Environment and Public Works Subcommittee on Water and Wildlife. My name is George Hawkins, and I serve as general manager of the District of Columbia Water and Sewer Authority - commonly known as DC Water. I am grateful for the opportunity to provide testimony today on a topic that has the potential to shape the future of our nation's waterways, nutrient trading.

By way of background, DC Water's infrastructure consists of 1,350 miles of water pipes; over 37,000 valves; four pumping stations; five reservoirs; three water tanks; and more than 9,300 public fire hydrants. Once that water is used, it travels through 1,800 miles of separated and combined sewer lines, nine wastewater and 16 stormwater pumping stations, 12 inflatable dams and a swirl facility. The existing sanitary sewer system in the District of Columbia dates back to 1810, and includes a variety of materials such as brick and concrete, vitrified clay, reinforced concrete, ductile iron, plastic, steel, brick, cast iron, cast in place concrete, and even fiberglass. A majority of the sewers in the DC Water system were constructed more than one hundred years ago and are still in operation. In addition, DC Water is responsible for the 50 mile long Potomac Interceptor System. This provides conveyance of wastewater from areas in Virginia and Maryland to Blue Plains, which is located at the southern tip of the District of Columbia.

Blue Plains: A case study

Blue Plains is the world's largest advanced resource recovery facility and its job is to take a stadium-sized volume of wastewater on an average day; treat it; and return it to the Potomac River just one disinfection step short of being clean enough to drink. We enjoy the distinction of being the world's largest "advanced" facility because our average of 300 million gallons of daily effluent requires additional treatment methods required to improve water quality in our rivers and the Chesapeake Bay. Given the scale of our facility, it's no surprise that DC Water's operations at Blue Plains are subject to significant mandates from the U.S. Environmental Protection Agency (EPA).

Our largest scale mandated infrastructure investment is the Clean Rivers Project. The project is the result of a 2005 consent decree with EPA and the U.S. Department of Justice and will nearly eliminate combined sewer overflows into the Anacostia and Potomac Rivers, and Rock Creek by 2025. The project is funded almost entirely by District of Columbia ratepayers and is estimated to cost $2.6 billion. Construction of the Clean Rivers Project is underway and includes the creation of massive underground storage and conveyance tunnels to capture sewage and stormwater during extreme wet weather events. We are also working with EPA to explore if green infrastructure projects can replace or compliment certain elements of the project.

Our second largest endeavor at the plant is the Enhanced Nitrogen Removal project which will reduce our nitrogen load to the Chesapeake Bay. Through an initial voluntary agreement and EPA's National Pollutant Discharge Elimination System (NPDES) permit, DC Water has reduced its nutrient loads on three separate occasions. EPA requires that reductions are achieved through technological and engineering projects designed at the limit of available technology. Unsurprisingly, as EPA standards have grown more stringent, the costs of removal technology have gone up exponentially, while the actual water quality benefits have gradually diminished.

The nutrients of concern at Blue Plains are nitrogen and phosphorous. Blue Plains was the first jurisdiction to meet the voluntary nitrogen reduction goal laid out in the Chesapeake Bay Agreement in 2000. This first action reduced nutrient levels by 40% of 1985 levels, from 14.0 mg/L to 7.5 mg/L at a relatively inexpensive cost of $16 million. The next phase of reductions ended in 2010 and nitrogen concentrations were reduced from 7.5 mg/L to 5 mg/L. This second phase reduction cost approximately $130 million, which is about eight times the cost of the original, larger reduction. In 2010, our NPDES permit was made more stringent to meet a lower limit by 2015. Now Blue Plains is required to reduce nutrients from 5 mg/L to 4 mg/L. This incremental reduction is estimated to cost $1 billion. The billion dollar Enhanced Nitrogen Removal project is now under construction and will provide a reduction of one milligram per liter, which is one tenth of the improvements made to date.

In summation, going from 14 mg/l to 7.5 mg/l, a reduction of 7.3 million pounds a year, cost $16 million; going from 7.5 mg/l to 5 mg/l, a further reduction of 2.9 million pounds a year, cost $130 million; and going from 5 mg/l to 4 mg/l, a still further reduction of 1.2 million pounds a year, will cost $1 billion. The capital cost of infrastructure to remove one pound of nitrogen has increased about 380 times, and in the last iteration of our permit, we achieve one-sixth the nutrient reduction for 60 times the unit cost of the first incremental reduction. The visual attached to my written testimony illustrates the costs and benefits of these projects.

Though DC Water appreciates the limited funding assistance it has received from the federal government, its metropolitan customers bear the bulk of the costs of nutrient removal projects. It is important to note that even if Blue Plains were to completely eliminate nitrogen discharges, local waterways and the Chesapeake Bay would still be impaired from other sources. Wastewater treatment plants as a whole contribute to only 17% of the total nitrogen load to the Bay and loads from Blue Plains make up only 2% of that category. Moreover, the cost to remove a pound of nitrogen or phosphorus from farm runoff and drainage is typically 4

to 5—and sometimes up to 10 to 20—times less than the cost to remove the same amount from municipal wastewater or stormwater[1].

Chesapeake Bay: Opportunity to pilot innovative watershed solutions

Our experience at Blue Plains reinforces the need to approach water quality improvements and regulation across state lines from a watershed perspective. The Chesapeake Bay region has the potential to collaborate and serve as a national example of a successful nutrient reduction effort. Market-based trading solutions and alternative fee structures offer relief to over-burdened utilities like DC Water, saving ratepayers money, engaging sectors that may not otherwise participate in nutrient reduction activities, and encouraging water quality improvements that go above and beyond minimum pollution control requirements.

It is my belief that a successful program must include the following elements:

Worst risks first. We need to tackle the worst sources and problems first, wherever they may be located in the watershed.

Sensible technology standards. Uniform, simple technologies to achieve improvements need to be established for identified sources.

Skin in the game. Everyone who contributes pollution to our water bodies needs to contribute.

Requirements and funding. Improvements need to be mandated, with substantial financial support from a sustainable funding mechanism.

One approach for a holistic nutrient reduction scheme incorporating these elements would begin by identifying and quantifying the sources of pollution and the best available technological solutions. Once identified and prioritized based on their water quality impact, the sources of the pollution would be required to implement projects to reduce nutrients on a reasonable schedule. As the pollutant sources at the top of the list are successfully addressed, sources further down the list must begin to reduce their nutrient contributions. Unfortunately, current practice ratchets down on wastewater treatment facilities when other sources are contributing more to the problem.

Rather than relying on metropolitan water and sewer bills, funds to finance these operations should be collected from all landowners and dischargers and then redistributed to the pollutant sources where the highest reductions and benefits can be achieved. States would receive funding in proportion to their contribution of pollutants to the Bay, and would distribute funding to the sources with new reduction requirements. Nutrient reductions would be

[1] National Association of Clean Water Agencies, "Controlling Nutrient Loadings to U.S. Waterways: An Urban Perspective". Oct. 2011. http://www.nacwa.org/images/stories/public/2012-03-06wp.pdf

mandated but come with substantial initial funding, slowly reduced over a significant time frame. Funding will be constantly redistributed to a rolling list of the highest-priority sources. Resources would flow to facilities like Blue Plains as long as they were the highest priority contributor. If other sources, such as industrial and agriculture facilities are identified as contributors, they would begin to receive funding.

Funds would be collected by billing every landowner in the watershed and a separate and distinct "Chesapeake Bay Fee" would be added to those with existing bills. The fee could be levied based on the size individual's landholding or the amount of impervious surface on their property. The fee would be relatively low since the funding base is broadened and the existing fees levied by Bay communities that are used to fund wastewater treatment plants may be reduced or replaced. Urban ratepayers will continue to contribute because broadened watershed investments will cost less than the current mandates imposed on their wastewater treatment plants. Incentives for landowners that adopt low impact development on their properties and assistance for low income citizens should also be considered.

A program of this kind would likely shift from the expensive capital projects found at Blue Plains to decentralized installation of water quality protection at thousands of individual suburban and rural parcels. Most work at wastewater facilities is undertaken by engineering firms, which often move specialized personnel from project to project. Under this program, efforts to reduce suburban and rural pollution will require skills and techniques that need not just an initial installation, but long-term maintenance and upkeep on each parcel of land. A decentralized solution would not only protect the water but will also build local businesses and lead to the permanent expansion of local jobs.

The dramatic infusion of funds into water quality protection will also drive the market and reduce costs. For instance, the installation of a green roof is still relatively unusual and therefore relatively expensive. The installation of thousands of low impact development techniques like green roofs, bioswales, pervious pavement, water quality catch basins, would support new businesses and reduce the unit cost overall as more firms can compete for the work.

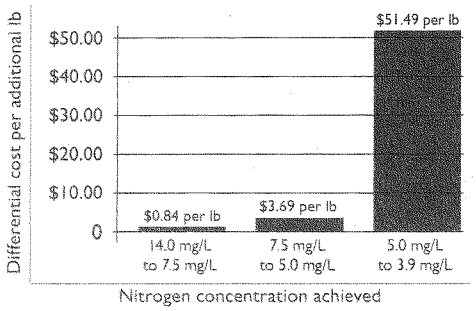
Conclusion

There are many challenges involved in creating watershed-based solutions to address our impaired waterways. However, the current state of diminishing returns on public investments cannot go ignored. If we are to seriously improve water quality in the Chesapeake Bay, we need to encourage programs that include and incentivize participation from all sources and sectors who contribute to nutrient pollution. We also need clear and consistent support from EPA and Congress to ensure the success of these watershed-based approaches. Water quality trading

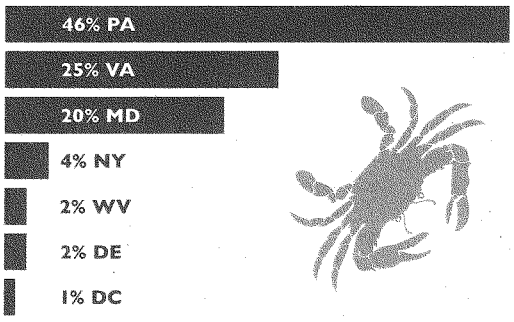
programs provide a valuable tool to achieve the water quality goals of the Clean Water Act, and are strongly supported by the larger municipal clean water community. I look forward to continuing the discussion and forwarding our shared goal of clean water for all. Thank you for the opportunity to testify and I am happy to answer any questions you may have.

dc THE COST OF ENVIRONMENTAL STEWARDSHIP

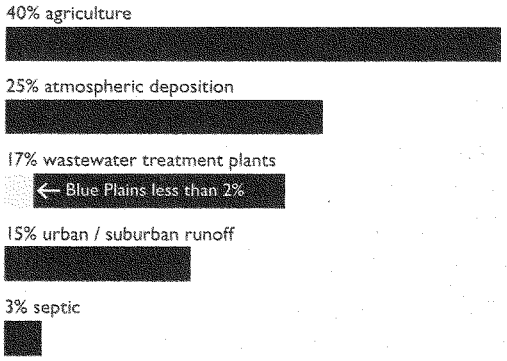
DIFFERENTIAL COST PER POUND OF TOTAL NITROGEN REMOVED



2011 NITROGEN LOADS TO THE BAY BY JURISDICTION *mil lbs/yr*



2011 NITROGEN LOADS TO THE BAY BY SOURCE *mil lbs/yr*



Responses to Questions from May 22 Environment and Public Works Committee Hearing

George Hawkins, General Manager, DC Water

Senator Cardin

Question: At the hearing you noted that a successful water quality trading market requires consistent rules and principles, which give certainty to point sources that would be seeking to buy credits. Do you believe there is a Federal role, working closely, with states, in setting common rules and standards for new water quality trading markets?

Response: Yes, I do believe the Federal government would have to play a central role in the development of a nutrient trading market.

Question: In a multi-state trading market, such as a market that covers the Chesapeake Bay watershed, what role do you feel EPA should play in facilitating establishment of a trading program? Do you think a water quality trading program can succeed without some coordination at the Federal level?

Response: Given the multiple jurisdictions that share the Chesapeake Bay watershed, the Federal government would need to play a role coordinating and regulating participation in a water quality trading market. EPA would also need to provide a level of regulatory certainty with respect to future regulations and standards in order for multiple jurisdictions and sectors to participate in a voluntary trading program. Without participation from the Federal government and EPA, I think it would be difficult for a nutrient trading market to succeed.

Senator Vitter

Question: For the District of Columbia's Blue Plains recovery facility, you've indicated that in 2010 your NPDES permit was "made more stringent" through a required nutrient reduction of 5mg/L to 4mg/L, and that this "incremental reduction is estimated to cost $1 billion." You note further that "the capital costs of infrastructure to remove one pound of nitrogen has increased about 380 times" over the years, and the in the District's latest NPDES permit, D.C. "achives one-sixth the nutrient reduction for 60 times the unit cost of the first incremental reduction."

What role did EPA play in this minimal yet extremely costly pollutant reduction? If EPA played a significant role, doesn't that suggest the agency needs to better account for the costs and benefits of its regulations?

Response: DC Water's NPDES permit is negotiated with and issued by EPA Region 3. In terms of the NPDES permitting process, DC Water agrees that a more comprehensive cost benefit analysis would help inform EPA of the impact of their regulations. Further anaylysis may also

lead EPA to pursue reduction methods that are not only less costly but produce greater water quality improvements.

Senator Boozman

Question: Mr. Hawkins, your testimony focused, essentially, on the law of diminshing returns, and the fact that at many point sources, we have squeezed out almost all, if not all, of the cost-effective reductions that are possible. As the Chairman put it, "we are not going to be able to sustain that kind of investment going forward for that type of marginal gain." Nutrient trading programs can obviously be structured in unique ways. What key features fo you, and other municipal water utilities, need in a program to be able to reassure your ratepayers that participation in a particular trading program is a worthwhile investment that will yield benefits to point source stakeholders?

Response:

A key feature needed for a successful nutrient trading program is to engage sectors such as agriculture that may not otherwise participate in nutrient reduction activities. In addition, a successful program must include the following elements:

Worst risks first - We need to tackle the worst sources and problems first, wherever they may be located in the watershed.

Sensible technology standards - Uniform, simple technologies to achieve improvements need to be established for identified sources.

Skin in the game - Everyone who contributes pollution to our water bodies needs to contribute to the identified solutions.

Requirements and funding - Improvements need to be mandated, likely by the Federal government, with substantial financial support from a sustainable funding mechanism.

Senator CARDIN. Thank you, Mr. Hawkins, for your testimony. You are the person who can make a wastewater treatment plant sound very exciting. We very much appreciate that.

[Laughter.]

Senator CARDIN. Dr. Matlock.

STATEMENT OF MARTY MATLOCK, PROFESSOR, DEPARTMENT OF BIOLOGICAL AND AGRICULTURAL ENGINEERING, AREA DIRECTOR, CENTER FOR AGRICULTURAL AND RURAL SUSTAINABILITY, UNIVERSITY OF ARKANSAS

Mr. MATLOCK. Thank you, Honorable Chairman Cardin, Ranking Member Boozman, distinguished members of the Committee, Subcommittee and diligent staff for this great opportunity to testify on this very important issue.

I have been chasing nutrients around watersheds for 20 years, trying to identify sources, trying to find solutions, trying to measure their impacts. It is a very difficult and complex process. I have worked with ag producers, with industries, with municipalities, with our regional EPA, State and local agencies, to try to understand and find a better way. Mr. Hawkins was very eloquent in defining our opportunities and our challenges economically.

Through this process I have come to believe that if we are to achieve increased productivity from the land and prosperity from the land, and improve water quality for future prosperity, we have to find a better way to manage our nutrients. We all live in watersheds. We all contribute to the problem. The nutrient problem belongs to all of us. So should the solutions. We all should have skin in the game, as Mr. Hawkins said.

So in the past, our approach to reducing undesirable outcomes has been focused on top-down management, finding the polluters and making the polluters pay. It has been very effective, history shows that. But it is not going to work here, it hasn't worked here. EPA has been trying for 20 years to find a better way to define nutrient trading strategies. Many of those strategies have been effective at some level. But we have not been able to replicate them well, because they are all context-specific.

So I believe that our challenge today is largely associated with uncertainty in the trading process. The fact is that the participants, especially land-based producers, agricultural producers, have high uncertainty about engaging in trading processes, high uncertainty associated with the regulatory risks that are associated with participating, and then our point source discharges, the permitted discharges, have equal uncertainty, or maybe even greater, because they are the ones with the regulatory sword over their heads, as it were.

Those uncertainties dramatically inhibit our ability to innovate our strategies. So again, I will close fairly quickly, because much of what I have in my written statement has already been covered. But it is my judgment the primary barriers to uncertainty can be reduced through collaborative and innovative and flexible strategies. But it is going to require collaboration at the Federal level, not just State and local level.

Thank you.

[The prepared statement of Mr. Matlock follows:]

TESTIMONY OF DR. MARTY MATLOCK,
EXECUTIVE DIRECTOR, OFFICE FOR SUSTAINABILITY,
PROGRAM DIRECTOR, CENTER FOR AGRICULTURAL AND RURAL SUSTAINABILITY,
UA DIVISION OF AGRICULTURE, UNIVERSITY OF ARKANSAS, FAYETTEVILLE, AR

BEFORE THE SUBCOMMITTEE ON WATER AND WILDLIFE
US SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

MAY 22, 2013

Honorable Chairman Cardin and Ranking Member Boozman, distinguished Members of the Subcommittee, and diligent staff, thank you for this opportunity to provide testimony to the Senate Subcommittee on Water and Wildlife on the subject of nutrient trading for protecting water quality throughout the United States. I have spent the past 20 years of my career chasing nutrients as they move through the watersheds of this country, identifying phosphorus and nitrogen sources, measuring impacts, and designing mitigation strategies. I have worked with agricultural producers, industries, and municipalities, as well as USEPA regional offices, to better understand and define solutions to issues associated with nutrient enrichment of our waterways.

Through this process I have come to believe that if we are to achieve increased productivity from the land and improved water quality for future prosperity we need a new way to manage nutrients from all sources in the watershed. One of the greatest obstacles is finding adequate funding for land-based best management practices (BMPs) on the land for nutrient transport prevention. Nutrient trading provides a promising strategy for overcoming this obstacle and achieving both these goals. We all live in watersheds. Nutrient enrichment in watersheds is a predictable outcome from all human activities. We all contribute to nutrient enrichment, either through our direct actions in our watersheds or indirect actions through the food we consume and products we purchase. The nutrient problem belongs to all of us, and so should the solutions.

In the past our approach to reducing undesirable outcomes from nutrient enrichment has focused on finding blame rather than solutions. Our history of pollution prevention and reduction has been based on the notion that the polluter pays. For conventional pollutants this approach has resulted in reduction of pollution from point sources, creating fishable and swimmable water bodies across the US. However, nutrients are not conventional pollutants; rather, they are both critical for ecosystem function at low levels and disastrous for ecosystem health at high levels. No single practice, technology, or approach will protect our waters from the impacts of nutrient enrichment. We must develop a more comprehensive, watershed-based, community-led approach.

Reducing nitrogen and phosphorus loads through nutrient trading within watersheds makes sense, but presents scientific, economic, and social challenges. Point sources such as municipalities and industries can partner with nonpoint sources such as row crop, specialty crop, and animal agriculture producers to find the most effective and affordable strategies for managing nutrient loads. This approach requires

quantifying nutrient credits from individual parcels of lands, finding economic advantages in nutrient load reductions with BMPs on those parcels, creating a market that provides equity across agents, and an adequate level of certainty of compliance with nutrient reduction goals. I worked with colleagues from Texas A&M University and the World Resources Institute more than a decade ago to develop NutrientNet, an online educational and demonstration program designed to support nutrient trading. Through this process we identified several key criteria necessary for successful nutrient trading programs: 1) a commonly understood nutrient concentration limit within the target streams; 2) an economic advantage for distributed, land-based BMPs over point source technologies to achieve those limits; 3)a broker to create and implement trades; and 4) regulatory certainty for National Pollutant Discharge Elimination System (NPDES) permit holders.

It is my judgment that the primary barrier to nutrient trading implementation is the uncertainty associated with compliance for NPDES permit holders. This uncertainty creates a perception of risk that stifles innovative solutions. Reducing this uncertainty may require a different approach to water quality permitting than the traditional NPDES compliance framework. We can never know with certainty the sources of nutrients across the landscape, and therefore must tolerate some level of uncertainty in land-based reductions of nutrient loads. Flexibility for innovation within the regulatory framework is necessary for developing and implementing effective nutrient trading strategies. USEPA has worked very hard over the past 20 years to develop and pilot a framework for nutrient trading. I strongly support USEPA's strategy for developing these regulatory innovations. Thank you for your time and interest.

Biography of Marty Matlock, Ph.D., P.E., B.C.E.E.

Professor of Ecological Engineering
Executive Director, University of Arkansas Office for Sustainability
Program Director, Center for Agricultural and Rural Sustainability
Biological and Agricultural Engineering
Room 233 Engineering Hall
University of Arkansas — Office: 479/575-2849
Fayetteville, AR 72701 — Fax: 479/575-2846
E-Mail: mmatlock@uark.edu — Cell: 479/935-6013

Dr. Matlock is a Professor in the Biological and Agricultural Engineering Department at the University of Arkansas. He is a registered professional engineer, a Board Certified Environmental Engineer, and a Certified Ecosystem Designer. He serves as Executive Director of the UA Office for Sustainability and is a Program Director in the Center for Agricultural and Rural Sustainability. Dr. Matlock has authored or edited three books, more than 30 peer reviewed manuscripts, and has been awarded two US patents and five international patents.

The focus of Dr. Matlock's research has been on metrics that inform sustainable practices in design. He uses life cycle assessment to quantify metrics for sustainability. He applies ecological and environmental risk assessment and decision engineering to optimize design, management, and sustainability strategies. He coordinates academic, research, outreach, and facilities efforts in sustainable systems across the UA

campus. He serves as Chair of the Cherokee Nation Environmental Protection Commission, and as science advisor for sustainability for 12 food and agricultural product companies.

EDUCATIONAL BACKGROUND

Ph.D. Biosystems Engineering, 1996. Oklahoma State University, Stillwater, Oklahoma.
M.S. Plant Physiology (Department of Botany), 1989. Oklahoma State University, Stillwater, Oklahoma.
B.S. Soil Chemistry (Department of Agronomy), 1984. Oklahoma State University, Stillwater, Oklahoma.

PROFESSIONAL EXPERIENCE

Executive Director, Office for Sustainability (July 1, 2012 – Present) University of Arkansas, Fayetteville, Arkansas.

Area Director, Center for Agricultural and Rural Sustainability, UA Division of Agriculture (November 2007-Present) University of Arkansas, Fayetteville, Arkansas.

Professor of Ecological Engineering, Biological and Agricultural Engineering Department (July 2009-Present) University of Arkansas, Fayetteville, Arkansas.

Associate Professor of Ecological Engineering, Biological and Agricultural Engineering Department (August 2003-June 2009) University of Arkansas, Fayetteville, Arkansas.

Assistant Professor, Biological and Agricultural Engineering Department (August 2001-2003) University of Arkansas, Fayetteville, Arkansas.

Assistant Professor, Agricultural Engineering Department, (May 1996-August 2001) Texas A&M University, College Station, Texas.

PROFESSIONAL CERTIFICATIONS

- **Professional Engineer**, License Number 88864, Texas Board of Professional Engineers, Austin, TX, 2001 – Present.
- **Certified Ecological Designer,** American Ecological Engineering Society, 2011-2016
- **Board Certified Environmental Engineer**, American Academy of Environmental Engineers, 2011-Present

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MEMBERSHIP IN PROFESSIONAL SOCIETIES

AAEES – American Academy of Environmental Engineers and Scientists

AEES– America Ecological Engineering Society – Past-President 2008-2009; President, 2007-2008;

ASABE – American Society of Agricultural and Biological Engineers
ASCE - The American Society of Civil Engineering – Environmental Engineering Committee

APPOINTMENTS AND SERVICE

US Secretary of Agriculture's AC21 Committee for the Future of Agriculture in the US, 2011-Present
Field to Market Alliance for Sustainable Agriculture. Executive Committee, 2010 – Present.
The Cherokee Nation Environmental Protection Commission Chair, October 2005 - Present.
Board of Directors, BlueInGreen, LLC, 2004-Present, Fayetteville AR (Owner/Founder)

UNIVERSITY OF ARKANSAS
DIVISION OF AGRICULTURE

UNIVERSITY of ARKANSAS
1871

Department of Biological & Agricultural Engineering
203 Engineering Hall • Fayetteville, Arkansas 72701 • (479) 575-2351 • (479) 575-2846 (FAX)

June 21, 2013

Mara Stark-Alcala
Senate Committee on Environment and Public Works
410 Dirksen Senate Office Building
Washington, DC 20510

Ms. Stark-Alcala,
I am respectfully submitting responses to questions posed by Senators Vitter and Boozman from my testimony before the Environment and Public Works Committee on May 22, 2013. If you have any questions or other requests please do not hesitate to contact me.

Questions from Senator David Vitter:

1. In your written testimony, you state that "[n]o single practice, technology, or approach will protect our waters from impacts of nutrient enrichment." Would you agree then with Assistant Administrator Shapiro's testimony that "states need room to innovate and respond to local water quality needs, and that a one-size-fits-all solution to nitrogen and phosphorus pollution is neither desirable nor necessary"?

Matlock Response: I agree with Assistant Administrator Shapiro's testimony as stated in the question. Effective control of nutrient pollution requires integration of science, management, and policy. The balance between these three processes will differ between watersheds, and even sites within a watershed. The ability to have room to maneuver, freedom to experiment, and opportunity to collaborate is critical for developing viable and equitable solutions to nutrient water quality management.

2. You have also written that "the primary barrier to nutrient trading implementation is the uncertainty associated with compliance for [National Pollutant Discharge Elimination System] permit holders," and that "[t]his uncertainty creates a perception of risk that stifles innovative solutions." Do you believe that if there's too much uncertainty, whether it's created by EPA or litigious environmental groups, there will be fewer participants in a trading system?

Matlock Response: I believe that the ability of municipalities, watershed management organizations, and other local and regional administrative authorities to engage in innovative nutrient trading programs is diminished by the uncertainties described in the question, among others. Providing stakeholders with a framework for nutrient trading that reduces these uncertainties will likely result in more active participation in this important program.

Question from Senator John Boozman
1. Mr. Matlock, will you elaborate on the differences between monitoring the implementation of conservation and best management practices by non-point sources that choose to participate in a trading program versus site-specific, "on-field" water quality monitoring?

Matlock Response: One of the major sources of uncertainty associated with nutrient trading programs between point source National Pollutant Discharge Elimination System permit holders and potential non-point source (NPS) contributors of nutrients to a receiving body of water is how much nutrient reduction is actually being achieved by NPS trading partners. Some trading schemes have recommended an edge-of-field monitoring program for all NPS partners to insure compliance with load reduction commitments. While this makes sense in the abstract, in reality there are numerous difficulties with this approach. The value of this sort of monitoring is the increased certainty of site-specific loads; the disadvantages include cost of implementation, difficulty in catching all the key loading events equally, and challenges of reconciling field data with in-stream conditions. Edge of field monitoring is expensive, because there are a lot of fields with a lot of edges, and they are often spread out over a large area. A modest edge-of-field monitoring program in a medium-sized watershed could cost as much as $1.5 million per year to implement and manage. Edge-of-field loads occur usually during significant rainfall events. These are the conditions that also lead to sampling equipment failures. Partial load data for a rainfall event across a watershed results in increased complexity for management, since there will inevitably be some fields that are missed. Finally, the nutrient loads at the edge of a field are not necessarily the loads at the edge of a stream, where they matter most. Many fields in a given watershed are not adjacent to a stream or river, and thus do not directly contribute loads to that water body. Nutrients often flow through subsurface tile drain systems, across grass-lined conveyances, or even across other fields prior to entering the water body. This complexity reduces the presumed value of edge-of-field monitoring.

A more effective strategy is segment-based in-stream monitoring, associated with implementation and tracking of on-farm conservation and best management practices (BMPs). Combined with reasonably simple geographic information system-based watershed nutrient transport models, this approach will provide causal evidence between the BMP level of implementation across a watershed and stream water quality. The power of directly measuring what you are managing cannot be over-stated. If in-stream water quality is not improving, watershed managers and stakeholders can develop and implement alternative strategies for reducing nutrient loads. This process requires full engagement of the trading stakeholders, insuring that system knowledge is shared, and creates the opportunity for collaborative learning across all participants. This approach requires flexibility and time.

Best regards,

Marty D. Matlock, PhD, PE, BCEE
Executive Director, Office for Sustainability
Program Director, Center for Agricultural and Rural Sustainability
Professor, Biological and Agricultural Engineering
233 Engineering Hall
University of Arkansas
Fayetteville, AR 72701

t-479/575-2849
f-479/575-2846
e- mmatlock@uark.edu

Senator CARDIN. Thank you very much for your testimony. We appreciate it very much.

Ms. Bodine.

STATEMENT OF SUSAN BODINE, PARTNER, BARNES & THORNBURG, LLP

Ms. BODINE. Thank you, Chairman Cardin, Ranking Member Boozman. Thank you for inviting me. And thank you for holding this hearing.

You have heard the testimony from all the witnesses. Everyone here, I think, supports trading. And that is a good thing.

In my written testimony, I did spend a section talking about the legal authority for trading under the Clean Water Act. I am not going to repeat that here. But I do want to say that that authority has been challenged in a pending lawsuit, and I am sure you are aware of that. On that issue, I am not going to go into the legal details, but I do want to talk a little bit about the policy issue behind a challenge to trading. I think Mr. Hawkins was most eloquent about the potential for trading in terms of cost savings and some of the numbers involved. And they are enormous, and the potential for savings is enormous as well. There are studies, in the context of the Chesapeake Bay, there are studies that the Chesapeake Bay Commission has done on cost and cost savings as well as the University of Maryland School of Public Policy has done and I have cited those in my written testimony.

But for the people who oppose trading, I can only imagine that they believe that they will get greater water quality improvements without trading. That is just a fundamentally misconceived notion. Because of the cost that Mr. Hawkins spoke about, and the cost of implementing something like the Chesapeake Bay TMDL. If you can't make this more affordable, it will be unachievable. And if water quality standards are unachievable, the Clean Water Act provides a mechanism for changing them.

So if people manage to get a court to agree that trading isn't allowed, the ultimate result won't be increased water quality, it will be a lowering of standards through use attainability analyses. So that policy issue I think is important to bear in mind when people are talking about whether trading is viable or not. I think all your witnesses here agree that it is viable. So that is important.

In my testimony I do address some of the issues, some of the barriers I think you have raised. And there are concerns about issues like what is the baseline, what are the verification practices. And also what the expectations are in terms of instant results. I want to talk a little bit about that. Senator Cardin and Senator Boozman, I think you both talked a little bit about certainty. Mr. Matlock talked about certainty. There is a concern I have heard actually in the context of Maryland about shifting baselines, moving the goalpost, more regulatory programs coming on board that change the baseline. And that is a concern.

There is a question about how programs establish baselines and whether they can be flexible so that there is at least a certainty that, for example, an agricultural producer that undertakes conservation measures will in fact generate a credit that they can later

sell. But if the baseline keeps changing because the regulations keep changing, that may not be the case.

We have heard concerns about privacy. Senator Vitter alluded to a concern that has arisen recently about EPA releasing personal identifiable information about farmers. That type of activity only raises the distrust. There is a distrust from the agricultural community of regulators.

On the issue of verification, it is certainly better to have ag community people deal with ag community people, whether it is an NRCS, or whether it is the soil and water conservation districts, those organizations are involved in trading programs at various levels. That certainly gives a level of comfort.

Monitoring I think was raised. Mr. Matlock talked about onsite water quality monitoring. One issue I wanted to raise with monitoring is the privacy issue of whether somebody is going to come onsite if it is a farm. But the other issue is something that is even more important; water quality monitoring is very expensive. When you are talking about non-point source reduction, monitoring is best done at a watershed basis. There has been a lot of good work done by Dr. Deanna Osmond down at North Carolina State University. She has written a book on this; she has given a lot of talks on this issue. Her point is that the monitoring is best done on the watershed basis. They have shown some really good, significant results down in North Carolina.

Finally, I want to address the role of Congress. Having this hearing today is important to show congressional support for trading. That helps States with their programs and helps EPA support the programs. I would caution against legislation that would dictate any details of trading, because as you have noted, there is an enormous variety. EPA's 2003 policy, as well as the Permit Writer's Tool Kit, allow that and acknowledge that there is room for a great deal of variety. So I want to caution against any legislation that would tell States how to do trading.

But as Dr. McGee pointed out, the 319 program funding is very valuable. Senator Boozman, you talked about your land grant college. The land grants have been tremendously helpful in addressing nutrient issues. In fact, for Iowa's nutrient reduction strategy, all the technical aspects of that strategy were performed at no cost to the State; but it was performed by the land grant college.

So funding the land grants, like in the legislation you are introducing, as well as funding for what is called the CEAP program, Conservation Effects Assessment Project, in NRCS, is important. The CEAP program does watershed scale monitoring, the kind of monitoring that can demonstrate the success of conservation practices. To continue to support that also is tremendously important. Thank you.

[The prepared statement of Ms. Bodine follows:]

TESTIMONY OF SUSAN PARKER BODINE
PARTNER
BARNES & THORNBURG
BEFORE THE SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
SUBCOMMITTEE ON WATER AND WILDLIFE
"NUTRIENT TRADING AND WATER QUALITY"
WEDNESDAY, MAY 22, 2013

Chairman Cardin, Ranking Member Boozman, members of the subcommittee, thank you for the invitation to appear today to testify on "Nutrient Trading and Water Quality." I am currently a partner in the law firm of Barnes & Thornburg. I have previously worked both as an assistant administrator for the Office of Solid Waste and Emergency Response at the U.S. Environmental Protection Agency and as a staff director of the Water Resources and Environment Subcommittee of the U.S. House of Representatives. Except during the term of my appointment at EPA, I have working on Clean Water Act policy issues for my entire career.

I would like to make three points in my testimony today:

- First, nutrient trading[1] is an available tool under the Clean Water Act for improving water quality.
- Second, without trading, in many cases meeting nutrient water quality standards will be neither affordable nor attainable.
- Third, trading will not happen if EPA or states impose too many barriers up front, before providing an opportunity to demonstrate the efficacy of trading.

I. Nutrient trading is an available tool under the Clean Water Act.

Trading and offsets are available tools for achieving water quality standards under the Clean Water Act.

The Clean Water Act requires point sources to meet technology based effluent limitations established under section 301(b)(1)(A). These effluent limitations establish a "floor" that must be met by each point source discharger and, in general, are based on best practicable control

[1] In this testimony, I refer to "trading" and "offsets" interchangeably.

technology currently available. Technology based effluent limits (TBELs) do not specify what technology must be used to achieve the limit. In some cases, trading or offsets are built into the TBEL itself.[2]

Unlike TBELs, water quality based effluent limitations (WQBELs) under section 301(b)(1)(C) apply to point source discharges as "*necessary to meet water quality standards*" in the receiving water. Thus, the focus of WQBELs is ambient water quality. If pollutants in receiving waters are reduced through other means, such as through reductions by other point or non-point sources, then a WQBEL that is *necessary to meet water quality standards* in the receiving water is different from the WQBEL that would be necessary absent the offsetting reduction from other sources. An offset or reduction achieved through trading would be incorporated into a permit writer's evaluation of whether a discharge has the "reasonable potential to cause or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." 40 C.F.R. 122.444(d)(1)(i). As stated in EPA's permit writers manual: "a reasonable potential analysis is used to determine whether a discharge, alone or in combination with other sources of pollutants to a waterbody and under a set of conditions arrived at by making a series of reasonable assumptions, could lead to an excursion above an applicable water quality standard."[3] The reasonable assumptions that are included in a permit writer's analysis may include assumptions of other reductions in pollutant discharges achieved through trading and offsets.

Unlike technology-based standards, WQBELs are not uniform and involve the professional judgment of a permit writer. Entities that argue that trading and offsets are not available tools for meeting water quality standards fail to understand the how effluent limitations are applied.[4]

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[2] *See, e.g.*, 40 C.F.R. Part 420 (Effluent Limitation Guidelines for the Iron and Steel Manufacturing Point Source Category). Pretreatment requirements under section 307 of the Clean Water Act also may be met through trading and offsets. *See* EPA, Office of Water, Water Quality Trading Policy, Jan. 13, 2013, at 6 (available as Appendix B of EPA's Water Quality Trading Toolkit for Permit Writers, EPA-833-R-07-004 (Aug. 2007, updated June 2009), http://water.epa.gov/type/watersheds/trading/WQTToolkit.cfm

[3] NPDES Permit Writers' Manual, at 6-23 (Sept. 2010).

[4] *See* Amended Complaint, *Food and Water Watch, et al., v. EPA*, Case No. 1:12-cv-01639-RC (D.D.C. Feb. 20, 2013). Food and Water Watch also alleges that trading is an impermissible adjustment to load and wasteload allocations of a total maximum daily load (TMDL) adopted under section 303(d) of the Clean Water Act. In making this claim, the plaintiffs fail to understand the legal nature of a TMDL. A TMDL is the total amount of a pollutant

Interstate trading also is permissible under the Clean Water Act. EPA has identified three separate authorities for interstate trading. First, section 103(a) of the CWA directs EPA to "encourage cooperative activities by the states for the prevention, reduction, and elimination of pollution, [and] encourage the enactment of improved and, so far as practicable, uniform state laws relating to the prevention, reduction, and elimination of pollution." In its Water Quality Trading Toolkit for Permit Writers EPA states that: "EPA believes that encouraging states to engage in cooperative, interstate activities like establishing multijurisdictional water quality trading programs designed to prevent, reduce, and eliminate pollution is consistent with the directives in section 103(a)." Water Quality Trading Toolkit, at 14. EPA also believes that congressional authorization under section 103(b) of an interstate compact[5] for "cooperative effort and mutual assistance for the prevention and control of pollution" also authorizes trading among members of the compact. *Id.* at 13-14. Finally, EPA believes that section 117(g) of the Clean Water Act authorizes interstate trading in the Chesapeake Bay Watershed. *Id.* at 13,

EPA has provided a number of examples of trading that have already taken place between point sources and between point and non-point sources.[6] Interstate trading also is taking place.[7] According to a U.S. Department of Agriculture-sponsored study, as of 2011 there were 24 active point-nonpoint trading programs in16 states.[8] A map and list of these programs from this study are reproduced at the end of this testimony, as well as a map from EPA's website of all active water quality trading programs.

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that a water body may receive and still meet water quality standards. The allocation of that load is left to the discretion of states that are implementing the TMDL.

[5] The Ohio River Valley Water Sanitation Commission (ORSANCO) is one such interstate compact.

[6] *See* Appendix A to EPA's Water Quality Trading Toolkit for Permit Writers.

[7] EPRI, Pilot Trading Plan 1.0, Ohio River Basin Interstate Water Quality Trading Project (within the basin subject to the jurisdiction of ORSANCO), Aug. 2012.

[8] In it Together, A How-To Reference for Building Point-Nonpoint Water Quality Trading Programs, Willamette Partnership (July 2012).

This testimony focuses on point source-nonpoint source trading. However, point source – point source trading also is successful and provides significant benefits.[9]

II. Without trading, nutrient water quality standards may not be affordable or attainable.

EPA has been pushing states to adopt nutrient water quality criteria and nutrient water quality based effluent limitations. However, EPA's recommended criteria developed under section 304(a) of the Clean Water Act and some state standards are based on the level of nutrients found in pristine waters and those levels in many cases are not attainable.[10] Even state standards that are not based on reference waters can be unachievable.[11]

The required reductions in nutrient and sediment loadings under the EPA established Chesapeake Bay TMDL provide an example. While the total cost of achieving the reductions in the TMDL has not been quantified, based on estimates provided by Virginia and Maryland, researchers from the Maryland School of Public Policy expect the total cost to exceed $50 billion.[12] A study commissioned by the Chesapeake Bay Commission further concludes that allowing trading could reduce those implementation costs by 36%.[13]

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[9] For example, to help achieve nutrient reductions in Long Island Sound, from 2002 to 2009 the total value of credits bought and sold among point sources through the Connecticut nitrogen trading program was $45.9 million, representing 15.5 million nitrogen credits exchanged. *See* http://www.ct.gov/deep/cwp/view.asp?A=2719&Q=325572

[10] *See, e.g.*, Jan 3, 2012 letter from EPA Region 8 to Montana Department of Environmental Quality, agreeing that attaining Montana's draft nutrient criteria would result in widespread economic and social impact and use of a technology that has not been demonstrated as practical, justifying a variance from those criteria.

[11] *See* Maryland Department of the Environment, Use Attainability Analysis for the Federal Navigation Channels Located in Tidal Portions of the Patapsco River (2004); Maryland Department of the Environment, Use Attainability Analysis for Tidal Waters of the Chesapeake Bay Mainstem and its Tributaries located in the State of Maryland (2004);

[12] Saving the Chesapeake Bay TMDL: The Critical Role of Nutrient Offsets, School of Public Policy, University of Maryland, Oct. 2012, at xv and Chapter 2, "Unaffordable TMDL Costs" (hereinafter The Critical Role of Nutrient Offsets).

[13] Nutrient Credit Trading for the Chesapeake Bay, an Economic Study, May 2012, at 54.

Other entities that have evaluated or are evaluating cost savings associated with nutrient trading include the World Resources Institute,[14] Electric Power Research Institute,[15] and Water Environment Research Federation.[16]

All conclude that trading and offsets can reduce costs of achieving water quality improvements. However, those cost reductions, will not be available unless trading and offsets are available. In fact, given the high costs of reducing nutrient loadings, it is likely that without trading nutrient standards will be unachievable and will need to be revised based on use attainability analyses. Thus, restricting trading could lead to lowering water quality goals.

III. Trading will not occur if EPA or states impose too many barriers, without providing an opportunity to demonstrate the efficacy of trading

There are a number of issues that must be addressed when using trading as a tool to improve water quality. How these issues are addressed will determine whether trading is available. These issues include establishing a baseline, geographic scope, providing a legal framework, and accounting for uncertainty in nonpoint source reductions.

A. Baseline

There is some dispute over what is an appropriate baseline of reductions in nutrient loadings that must be met before a nonpoint source can generate credits available to offset point source discharges. Achieving early reductions in pollutant loadings is an objective of EPA's Water Quality Trading Policy. That objective suggests that flexibility is appropriate when establishing baselines.

EPA's trading policy supports establishing a nonpoint source baseline based on either regulatory requirements or load allocations under a TMDL. That position is not universally accepted. The

[14] *See, e.g.*, Nutrient Trading in the MRB, A Feasibility Study for Using Large-Scale Interstate Nutrient Trading in the Mississippi River to Help Address Hypoxia in the Gulf of Mexico, World Resources Institute (Apr. 17, 2013).

[15] EPRI, Pilot Trading Plan 1.0, Ohio River Basin Interstate Water Quality Trading Project (within the basin subject to the jurisdiction of ORSANCO), Aug. 2012.

[16] WERF factsheets on implementing watershed-based trading programs are available at http://ww2.werf.org/am/template.cfm?section=Search&template=/cm/ContentDisplay.dfm&ContentID=6843 See also WEF workshop on water quality trading at www.wef.org/WaterQualityTrading/

University Of Maryland School Of Public Policy suggests that current level of nutrient loadings is an appropriate baseline, which would allow credit for coming into compliance with regulatory requirements:

> One option to consider thus is whether agricultural baselines should be set at less than the full legal requirements for agriculture, acknowledging the uncertainty of immediate legal compliance, and thus potentially accelerating the improvement of farmer nutrient management practices (a particularly important goal given the large share of total Bay nutrient loads that originate in agriculture and the low cost of many potential agricultural nutrient reductions). The Critical Role of Nutrient Offsets, at xxiii.

Many states have trading programs that establish a nonpoint source baseline that relies on the state regulatory requirements for nonpoint sources, if any. State regulatory requirements were the basis for the Pennsylvania trading program that this subcommittee heard about from Red Barn Trading Company in a November 9, 2009 hearing on the Chesapeake Bay TMDL. In 2010, Pennsylvania modified its trading program. In addition to meeting baseline requirements, nonpoint sources must also meet a threshold before generating credits. This requirement is defined as either a 100-foot manure set back, a 35-foot vegetative buffer or a 20% adjustment made to the overall reduction. 25 PA.CODE CH. 96. However, EPA has disagreed with Pennsylvania about its program and its applicability to trades to achieve the Chesapeake Bay TMDL.[17]

The issue of defining a nonpoint source baseline has come up in other parts of the country as well. Comments on Wisconsin's trading policies support adoption of a nonpoint source baseline based on the regulatory requirements applicable to nonpoint sources. In Wisconsin, only cost-shared practices are mandatory. Despite this, Wisconsin's draft trading policy proposed to adopt a Phosphorus Index of 6 as a baseline for all nonpoint sources, in addition to all load allocations identified in a TMDL. Absent cost-sharing, Wisconsin does not impose mandatory requirements on nonpoint sources, whether or not there is a TMDL, thus commentors argue that a Phosphorus Index of 6 is not always the appropriate baseline and adopting such a baseline will reduce or

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[17] *See* EPA, Pennsylvania Trading and Offset Program Review Observations, Feb. 17, 2012, available at http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/EnsuringResults.html?tab2=1&tab1=2

eliminate the availability of credits. *See* letter dated April 26, 2013 from Madison Metropolitan Sewerage District, to Wisconsin Department of Natural Resources.

In response to comments from EPA on its trading policy, Montana Department of Environmental Quality (MT DEQ) takes a position that is similar to MMSD. MT DEQ's draft trading policy defines baseline in a manner that allows a nonpoint source to generate credits as soon as it begins to reduce its nutrient load without first meeting the load allocation assigned to the nonpoint source.

> One of the reasons for allowing a nonpoint source to generate credits as soon as it begins to reduce its nutrient load is that the load allocation in a TMDL is typically aggregated for all similar nonpoint sources through out an entire watershed. Defining "baseline" so that all nonpoint source contributors need to achieve (collectively) the watershed load allocation before a credit may be generated would eliminate the majority of trading opportunities and greatly reduce the effectiveness of this policy.[18]

One way to identify a nonpoint source baseline in a way that is consistent with EPA's Water Quality Trading Policy would be to allow nonpoint sources to achieve credit for the percentage of nonpoint source load reductions that is not assumed by a TMDL implementation plan. For example, in the Chesapeake Bay TMDL most of the best management practices (BMPs) identified in the state implementation plans are not assumed to be applied on 100 percent of available land. If state assumed a BMP would be applied on 75 percent of available acres, then under this approach it could approve credits for BMPs on 25 percent of available acres, even if the BMPs had not yet been installed on the remaining 75 percent of acres. This approach would be consistent with EPA's goal of using trading to achieve early reductions.

Using the Chesapeake Bay watershed as an example again, it is important to note that each state defines its baseline for trading credits generated by nonpoint sources differently, and given the different regulatory requirements in each state, a uniform baseline policy would not be appropriate.

[18] MT DEQ Draft Trading Policy Response to Comments, Oct. 28, 2011, at 1. MT DEQ also points out that the nonpoint source reductions are voluntary.

B. Geographic Scope

Under EPA's Water Quality Trading Policy, a trading area must be either within a watershed or within an area for which a TMDL has been approved. There can be dispute over what size watershed is used for generating tradable credits. There also can be dispute over what delivery factor is used if trades take place from within a large watershed.

The geographic scope of a trade and whether a delivery ratio is appropriate is a case and water body specific issue that should be left to the implementing state.

There are some who argue that no trades should be allowed, or should be allowed only within a very small geographic area, to alleviate concerns over "hot spots." "Hot spots" are generally a concern when dealing with toxic pollutants. Water body responses to nutrients are so highly variable and so highly dependent on site-specific factors such as flow, shade, and hydrologic modification that it is very unlikely that a trade would be the cause of a localized algal bloom or other adverse impact. Nutrient loadings high enough to cause a local impact can be prevented by state regulatory agencies on a case-by-case basis.

Where trading takes place under a TMDL, hot spots are unlikely due to the margin of safety required in a TMDL. Hot spots also are highly unlikely to take place as a result of trading to implement the Chesapeake Bay TMDL because over 50 million pounds of nitrogen reduction were added to the TMDL to achieve dissolved oxygen water quality standards in four deep bay segments. Water quality standards in the remaining 88 segments of the Bay would be achieved with far fewer nitrogen reductions.[19]

Refusing to allow trading other than in local areas to alleviate concerns over hot spots would limit the utility of trading as a water quality improvement and cost reduction tool. The

[19] "The basinwide allowable nitrogen and phosphorus loads were determined on the basis of achieving a select set of deep-water and deep-channel DO standards in the mainstem Bay and adjoining embayments .... The Bay TMDL calls for nitrogen load reductions upwards of 50 million pounds greater than that necessary to achieve the applicable DO WQS in those four Bay segments compared with many of the remaining 88 Bay segments." EPA, Chesapeake Bay TMDL, Dec. 2010, at 6-14.

importance of allowing a broad geographic scope for trading is noted by the University Of Maryland School Of Public Policy:

> Expanding the scope of the allowable offset area has a large impact on the potential Baywide cost savings achievable. As compared with offsets limited to the same river basin and state as the WWTP, expanding the eligible area for offsets to the whole state generated an estimated 31 percent cost savings. Some basins such as the Potomac encompass multiple states. Allowing eligible offsets anywhere in the same river basin (potentially across state boundaries) increased the cost savings to 43 percent. Most impressive of all, allowing offsets to be obtained anywhere in the Chesapeake Bay watershed generated potential costs savings for the Bay cleanup of 87 percent. As these figures suggest, there are large economic advantages from a Baywide perspective to providing a maximum of flexibility in the geographic locations at which offsets can be obtained.[20]

C. Legal Framework

As noted by EPA in its Water Quality Trading Policy, there are a large variety of ways to structure a legal framework for water quality trading. These include legislation, rule making, NPDES permits, TMDLs, watershed plans, private contracts, and third party contracts.[21] The type of legal framework should be left to the state and the trading partner.

Trading with nonpoint sources may be the most successful where conservation partners, such as state Farm Bureaus and soil and water conservation districts function as aggregators for programs. Private entities also may serve this function, as you heard in testimony from Red Barn Trading Company during your November 2009 Chesapeake Bay TMDL hearing. Credit aggregators can provide the oversight functions that might otherwise be left to a regulatory agency. An agricultural producer may be more likely to agree to generate credits if the producer does not need to give federal or state regulatory officials access to their property.

D. Addressing Uncertainty and BMP Verification

In the Water Quality Trading Toolkit for Permit Writers, EPA identifies a number of mechanisms for addressing uncertainty associated with nonpoint source reductions. These

[20] The Critical Role of Nutrient Offsets, at xxiii.

[21] EPA Water Quality Trading Policy, at 8; Water Quality Trading Toolkit for Permit Writers, EPA-833-R-07-004 (Aug. 2007, updated June 2009), Water Quality Trading Scenario: Point Source-Nonpoint Source Trading, at 12-15.

include offset ratios, monitoring BMP effectiveness, modeling BMP effectiveness, and estimating BMP effectiveness. It is important to note that the lower the uncertainty of BMP effectiveness, then the lower the need for a credit ratio greater than 1:1.

Because it is difficult to measure reductions in loadings of nutrients from conservation practices adopted on the land,[22] most trading programs use models or other calculations to estimate such pollutant reductions. For example, EPRI is using EPA's Watershed Analysis Risk Management Framework model for its Ohio River Basin pilot project. This modeling allows for the incorporation of difference in assimilation of pollutants within areas of the watershed, allowing for a broad geographic scope for trades. In addition, in the Ohio River Basin, all trades will be executed with trading ratios will be informed by watershed modeling. As noted above, a uniform trading ratio would not be appropriate as a result of geographic differences.

Uncertainty also is reduced by including requirements for conservation practice inspections and certification in trade agreements. Different states have different procedures for ensuring that BMPs are implemented and maintained. In most states, these procedures are implemented by the state department of agriculture. For example, the Maryland Department of Agriculture inspects at least 10% of all traded agricultural credits per year. Third-party inspections also can be used.

If trading is to be successful, there must be willing nonpoint source partners from the agriculture producer community. An agricultural producer is far more likely to participate if the producer knows he or she will be interacting with familiar entities and programs, such as NRCS and state soil and water conservation districts. If EPA or a state water quality agency is given authority to monitor BMP implementation, maintenance, or effectiveness on agricultural land, it is likely that few or no producers will participate.

In addition to verification of BMP implementation, EPA's Trading Toolkit recommends programmatic evaluations, including studies "to quantify nonpoint source load reductions, validate nonpoint source pollutant removal efficiencies." These functions should be carried out by entities in the agricultural community. EPA's Trading Toolkit also recommends "ambient

[22] Nonpoint sources have no discharge point that can be monitored.

monitoring to ensure impairments of designated uses (including existing uses) do not occur and to document water quality conditions." This function can be carried out by environmental agencies. These programmatic evaluations should be used to improve a trading program generally, and not the success of any individual trade.[23]

If a programmatic evaluation identifies a problem then it should be addressed by changing program requirements going forward, without invalidating a particular point source permit. Permits can be changed upon renewal to reflect revised programmatic requirements. Permits that incorporate trading could include conditions such as compliance schedules, to address issues related to lag times between BMP installation and changes to ambient water quality, impacts of extreme weather on ambient water quality, or BMP effectiveness that is less than expected. Alternatively, a state could ensure that adequate credits are available in a credit bank or exchange to allow a point source to obtain replacement credits if needed. Financial liability for the purchase of replacement credits would be addressed in any contract between the point source and the nonpoint source. In trades involving third party aggregators, the aggregator could take this risk and supply the replacement credits, if needed.[24]

Conclusion

Nutrient trading is already occurring and, unless constrained by overly stringent policies, trading shows great promise in reducing costs for water quality improvement.

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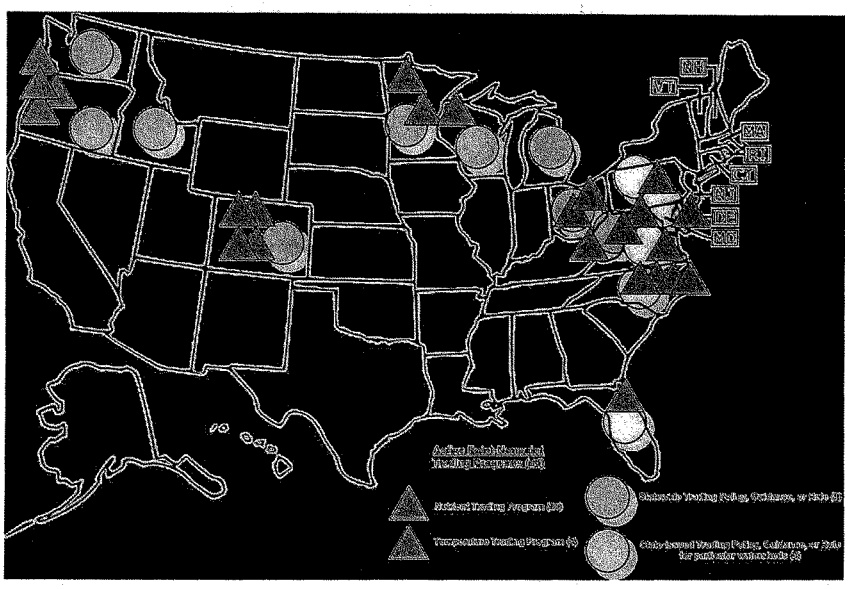
[23] In particular, changes in ambient water quality resulting from nonpoint source BMPs must be tracked over a period of time before water quality changes can be detected. Dr. Deanna Osmond of North Carolina State University recommends monitoring through programs such as USDA's Conservation Effects Assessment Project (CEAP) program. *See* Osmond, D.L., D.W. Meals, D. LK. Hoag, and M. Arabi, eds. 2012. How to Build Better Agricultural Conservation Programs to Protect Water Quality: The National Institute of Food and Agriculture–Conservation Effects Assessment Project Experience. Ankeny, IA: Soil and Water Conservation Society, available at http://www.swcs.org/en/publications/building_better_agricultural_conservation_programs/

[24] Many of the issues identified here are addressed in a report titled: Getting Paid for Stewardship: An Agricultural Community Water Quality Trading Guide, Conservation Technology Information Center (July 2006), available at www.ctic.org/resourcedisplay/261/

Map of Active Point-Nonpoint Water Quality Trading Programs and State Policies [25]



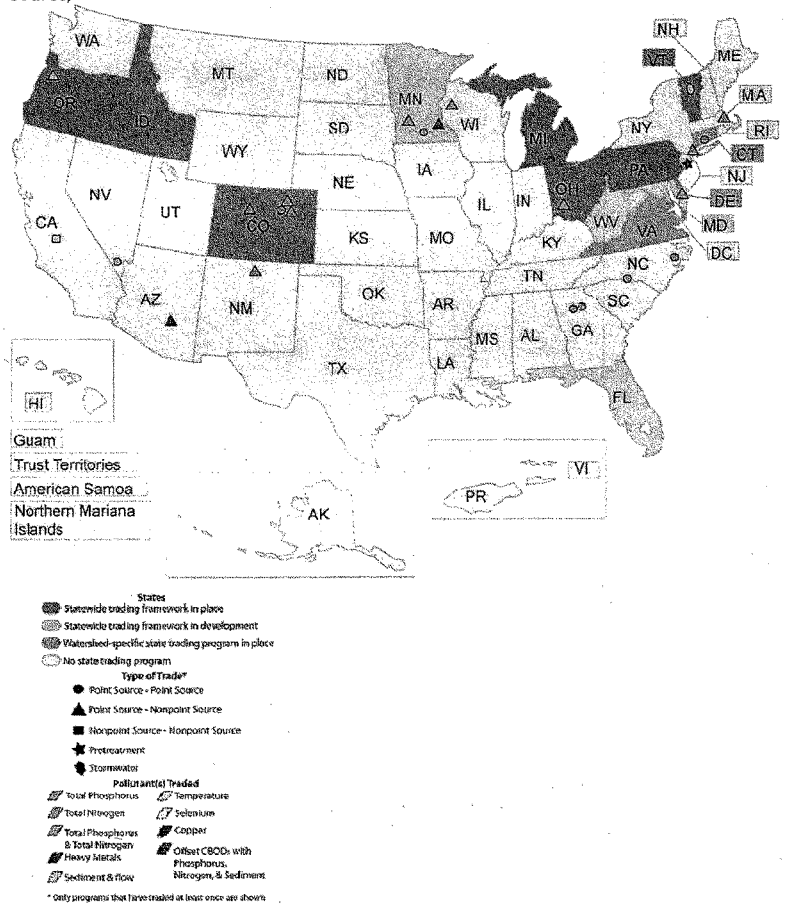
[25] In it Together, A How-To Reference for Building Point-Nonpoint Water Quality Trading Programs, Willamette Partnership (July 2012), at 15.

Active Point Source - Nonpoint Source Trading Programs in the United States in 2011[26]

Program	State	Market structure
Bear Creek	CO	Bilateral & Brokered trades
Chatfield Reservoir	CO	Bilateral
Cherry Creek Basin	CO	Sole-source offsets
Lake Dillon	CO	Bilateral
Delaware Inland Bays	DE	Bilateral
Lower St. Johns River	FL	Bilateral
MD Chesapeake Bay	MD	Auction & Bilateral
Rahr Malting	MN	Brokered trades
Southern Minnesota Beet Sugar Coop	MN	Bilateral & Sole-source offsets
Falls Lake	NC	Bilateral from private banks & in-lieu fees to the NC Ecosystem Enhancement Program
Neuse River	NC	Bilateral from private banks & in-lieu fees to the NC Ecosystem Enhancement Program
Jordan Lake	NC	Bilateral from private banks & in-lieu fees to the NC Ecosystem Enhancement Program
Tar-Pamlico Estuary	NC	Bilateral from private banks & in-lieu fees to the NC Ecosystem Enhancement Program
Great Miami River	OH	Sole-source offsets
Sugar Creek (Alpine Cheese)	OH	Bilateral & Brokered trades & Exchange
Ohio River Basin Trading Project	OH	Auction
Tualatin River (Clean Water Services)	OR	Sole-source offsets
Rogue River (Willamette Partnership)	OR	Sole-source offsets
Willamette River (Willamette Partnership)	OR	Sole-source offsets
Lower Columbia (Willamette Partnership)	OR	Sole-source offsets
PA Chesapeake Bay	PA	Auction & Bilateral & Brokered trades
VA Chesapeake Bay	VA	Bilateral through the VA Water Quality Improvement Fund or brokered trades for compliance credits exchanged through the VA Nutrient Credit Exchange Association
Red Cedar River	WI	Bilateral
WV Potomac/Chesapeake Bay	WV	Auction & Bilateral

[26] In it Together, A How-To Reference for Building Point-Nonpoint Water Quality Trading Programs, Willamette Partnership (July 2012), at 16.

State and Individual Trading Programs (point source to point source and point source to nonpoint source)[27]



[27] Available at http://water.epa.gov/type/watersheds/trading/tradingmap-big.cfm

RESPONSES OF SUSAN BODINE TO QUESTIONS FOR THE RECORD
FROM THE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
SUBCOMMITTEE ON WATER AND WILDLIFE
"NUTRIENT TRADING AND WATER QUALITY"
WEDNESDAY, MAY 22, 2013

Questions from Senator Vitter:

1. You've indicated in your written testimony that "[t]trading will not occur if EPA or states impose too many barriers, without providing an opportunity demonstrate the efficacy of trading." Can you provide some examples of barriers EPA has or may impose that would inhibit nutrient trading?

A trade between a point source and a nonpoint source generally is carried out under a contract between the two parties. The nonpoint source agrees by contract to implement best management practices (BMPs) that are designed to reduce soil erosion or the loss of nutrients from a farmer's field. The permitting authority can then give the point source credit for that reduction when evaluating ambient water quality and determining whether a point source discharge has a reasonable potential to contribute to a water quality standards violation. In some cases, the contract is with a third-party aggregator who then sells the credits to point sources. In both of these scenarios, trading is market-based. There are some who want to change trading from a market-based approach to water quality improvement to a regulatory approach. Specifically, these persons want to regulate the nonpoint sources that are generating the credits.

Under this regulatory approach, EPA could purport to require a farmer to implement certain baseline practices and allow credits only for additional BMPs, beyond that baseline. Such a requirement would make it more difficult and costly for a nonpoint source to generate credits, since the nonpoint source would not recoup the cost of the baseline requirements.

EPA also could purport to impose monitoring requirements on nonpoint sources, even though there are no discharges that can be monitored. Experts, including a witness at the hearing, Dr. Matlock, agree that monitoring at the farm level would be an unreasonable burden and expense because changes in water quality will only be seen at the watershed level.

Finally, EPA could purport to require verification by a regulator or a third party that BMPs are installed and maintained, even though EPA has no authority to enter and inspect nonpoint sources. Farmers likely would oppose verification by a regulatory official. Farmers are used to receiving technical assistance from state and federal soil and water conservation experts, but those experts do not have regulatory authority. Depending on the third party, farmers likely also would oppose third party verification for both privacy and food security reasons. A farm is often a home, creating privacy concerns. In addition, people can be vectors for disease, creating food security issues. Finally, there are many instances where third party activists seek to gain access to or actually trespass on farms for the purpose of harassment, or even criminal activity. In an example of harassment, the Waterkeeper Alliance (based in New York) sued a farm owned by Alan Hudson and his wife on the Eastern Shore of Maryland after flying over the farm and

observing what they thought was a pile of poultry litter. The pile was in fact treated sewage sludge from a publicly owned treatment works. The Waterkeepers then tried to sue the farm based on air emissions from exhaust fans in the poultry houses. In a scathing opinion, the District Court for the District of Maryland dismissed the case after two years of failed attempts by the Waterkeepers to provide evidence of a discharge of pollutants to water. *Waterkeeper Alliance, Inc. v. Alan Hudson, et al.,* CA No. WMN-10-487 (D. Md. Dec. 20, 2012). The facts of this case are a cautionary note to the agricultural community and provide an example of why farmers are likely to oppose third party verification, unless the verifier is someone whom they trust. For examples of criminal trespass, and even arson, see the comments filed by agricultural entities on EPA's now-abandoned attempt to create a public data base of all animal feeding operations. *See* regulations.gov, proposed CAFO Reporting Rule, Docket Number EPA–HQ–OW–2011–0188. EPA's actions to distribute personally identifiable information about farmers to activist groups after withdrawing the CAFO Reporting Rule provide an example of why agricultural groups often do not trust EPA.

Above, I say EPA could "purport" to impose these requirements because EPA does not have regulatory authority over nonpoint sources. Its only direct authority to impose conditions on trading is a threat to veto a point source permit that relies on trading. EPA also could attempt to coerce states into imposing requirements by making threats to veto permits or withhold federal funding, as was done to coerce states regarding implementation of the Chesapeake Bay TMDL. These threats would not reach farmers. Nonpoint sources can always choose to not participate in trading, rather than agree to regulatory requirements or intrusive oversight. As a result, such threats are likely to curtail trading, reducing the opportunities for cost-effective water quality improvements.

2. EPA for the most part has taken a "hands off approach on nutrient trading, giving states room and time to decide to develop this relatively new approach to pollution reduction. Do you believe that the states have the ability to develop effective trading schemes? What gives them the authority to do so under the Clean Water Act?

As noted in my testimony, according to a U.S. Department of Agriculture-sponsored study, as of 2011 there were 24 active point-nonpoint trading programs in 16 states. So, trading already is successfully occuring. There also is a pilot interstate trading program that is being developed for the Ohio River under the leadership of the Electric Power Leadership Institute, a private organization.

States have authority to approve permits that rely on pollution reductions achieved by nonpoint sources when determining what water quality based effluent limits should be imposed in a point source permit. This is because water quality standards are designed to protect ambient water quality and the source of the pollution reductions does not matter when you are measuring ambient water quality. Further, a state that has received authority to carry out its own Clean Water Act permitting program in lieu of the federal NPDES program also has the authority to decide how to implement that program under the cooperative federalism structure of the Clean Water Act.

I would note that for D.C. Water, EPA Region 3 is their permitting authority. Thus, it makes sense that the General Manager of D.C. Water testified that he wanted to know that EPA would accept credits from state trading programs before using trading to meet D.C. Water permit limits. This would be analogous to a Pennsylvania POTW wanting to make sure that the Commonwealth of Pennsylvania would accept trades from a Maryland or Virginia trading program, before using credits from such programs to meet Pennsylvania permit limits.

3. If we are to achieve effective nutrient trading systems throughout the country, what role do you see EPA having in this effort?

EPA can signal support for trading, describe the various mechanisms that can be used to implement trading, and provide examples of successful trading. EPA's 2003 Trading Policy and its 2007 Water Quality Trading Toolkit for Permit Writers (updated in 2009), are good examples of how EPA can promote trading without being overly prescriptive. EPA Region 3's attempts to impose restrictive baseline requirements on state trading programs in the Chesapeake Bay watershed is an example of how EPA can be a barrier to effective trading programs. As noted in my written testimony, other EPA Regions also have tried to impose similar prescriptive baseline requirements in other states as well.

4. You have also observed that "[i]f trading is to be successful, there must be willing nonpoint source partners from the agricultural producer community," and that, if EPA or a state water quality agency is given regulatory authority over the implementation of best management practices on agricultural land as a condition of generating credits for trading, "it is likely that few or no producers will participate." Can you explain this concept?

Nonpoint sources, like agricultural runoff, are not regulated under Clean Water Act. Thus, the federal and state EPAs do not have regulatory authority over farmers unless they operate a concentrated animal feeding operation (which is defined as a point source). In states that impose requirements on agricultural sources of water pollution, the program is usually implemented by the state department of agriculture, not the state EPA. Both state and federal EPAs are ill suited to working with farmers because they are accustomed to regulation of end of pipe discharges that can be routed through treatment plants and monitored. Addressing nonpoint source pollution involves addressing how land is managed. That is not an area where state and federal EPA's have expertise, experience, or understanding. For this reason neither the U.S. Congress, nor state legislatures have given land management authority to these agencies. In addition, farmers often do not trust EPA to be a partner who helps farmers be good stewards of the land. Instead, EPA is perceived as being interested in regulation and enforcement. For these reasons, farmers would likely refrain from participating in trading programs that give a state or federal EPA authority over land management.

Question from Senator Boozman:

1. Ms. Bodine, in your testimony, you mentioned that "if people manage to get a court to agree that trading isn't allowed, the ultimate result won't be increased water quality, it will be a lowering of standards through use attainability analyses." The concern seems to be that wholesale opposition to trading may be short-sighted. Will you elaborate further on why the consequences you mentioned are likely to occur in such a scenario?

Trading provides a means of meeting water quality standards. Water quality standards are established by states by first designating a water body for a particular use, or suite of uses, and then establishing criteria that the water must meet to protect those designated uses. Thus, a water body may have aquatic life, drinking water, and primary contact designated uses. The criteria components of the water quality standards are set at levels to protect those uses. However, water quality standards are not set in stone. The Clean Water Act allows states to change the designated use of a water body based on a use attainability analysis. If the current use is not attainable, then a state may adjust the use to one that is attainable, with EPA approval. One basis for making such an adjustment is a determination that achieving the designated use would cause substantial and widespread social and economic impact.

The estimated costs of meeting nutrient water quality standards can be alarming. For example, the estimated cost of reducing nutrient and sediment loads to meet the allocations of the Chesapeake Bay TMDL is over $50 billion. There are a variety of studies, cited in my written testimony, that demonstrate that trading can make the cost of reducing nutrient levels more affordable. If trading is not available then the cost of the Chesapeake Bay TMDL would likely impose substantial and widespread social and economic impacts on many communities. Those impacts would be a basis for changing the water quality standards in the Bay to remove uses from some segments. For example, the Chesapeake Bay TMDL requires an extra 50 million pounds of nitrogen reduction to achieve dissolved oxygen standards in four deep segments of the Bay to protect the worms that live there. This means that instead of reducing nitrogen levels by 67 million pounds from a 2009 baseline of 268 million pounds, the TMDL could require only a 17 million pound reduction in nitrogen and still protect the designated uses of the other 88 segments of the Bay. If achieving dissolved oxygen levels in those 4 deep water channels proves to be too costly, then Maryland can remove the aquatic life use for those deep channels. This is not the result that opponents of trading are seeking. Opponents of trading think that they are promoting increased water quality protection when they may be promoting the removal of water quality protections, when existing standards prove to be unachievable goals.

Senator CARDIN. Ms. Bodine, I just want to underscore a point that you made, and I think it is a very valid point. That is, Mr. Hawkins' cost of getting that last percent down and how much that is of the overall game plan on nutrient reduction. He didn't talk about how difficult it was for him to get all the financing, but it was not easy.

With cost benefit analysis becoming so much in the spotlight, we will not be able to sustain those types of investments for that type of growth in the future. But those who believe that we are going to get that type of reduction in the future, we are not.

I would point out to Mr. Hawkins, I am sure he agrees with this, that storm runoff is our No. 1 growth area of problems. We have to deal with storm runoff. And the investment being made at Blue Plains is an incredible infrastructure improvement to deal with storms, basically, so you have the flow that doesn't overflow and cause the nutrients to go untreated into our waters and streams and rivers. So the trade off is important. But I think you are absolutely right, we are not going to be able to sustain that kind of investment going forward for that type of marginal gain. So we have to look at other ways to be able to accomplish this.

I want to ask Dr. McGee and perhaps Ms. Bodine, you specifically mentioned the evaluation process, third party transparency, you mentioned doing it local and making sure that there is credibility. Can you both elaborate a little bit more how the evaluation process should be supported by EPA, supported by us to make sure that in fact, the credits are there, that the progress is being made? What do you mean by independent third party? What do you mean by transparency?

Ms. MCGEE. Sure. I think EPA's role in this is to establish what verification looks like, does it include photographs, how often should that be done, what should the documentation look like. I don't think right now they have a role in doing the verification.

When we say third party verification, we are talking about an independent person, not associated with the government. Senator Boozman said something about conservation districts or USDA employees. We would not support that, but the reality is that third party verifiers who know farms are probably retired from those organizations. So what we are looking for is an independent third party to come in and verify on a farm that yes, I did plant those trees and here is the documentation, here are the photographs and that would all be set by EPA.

Another layer of verification would be that the State regulating entity would be doing some spot checks on that verification. So they wouldn't necessarily be going out to every farm, but they might check 10 percent of them, or a certain percent of the farms, sort of verifying the third party verifier, if you will. So that is, when we talk about verification, that is what our intention is.

Senator CARDIN. Ms. Bodine, would the farmers think that is a positive step?

Ms. BODINE. I would suggest that it is not really EPA's role to get into that level of detail, to establish what is a specific State verification process. And the States do have different approaches. In Maryland, for example, the State Department of Agriculture

does go out and inspect 10 percent of the trades. And the trades also do require an annual third party inspection.

You have programs, for example, in Pennsylvania where you have aggregators, like the Red Barn Trading Company that testified before this Subcommittee a number of years ago. They serve as a verifier. They aggregate credits. But they can also be a verifier on the other side and interact.

My point is that there are different models out there and that one model isn't necessarily better than the other. Yes, the BMPs have to be in place, there is no dispute on that.

I know I am over your time. There is another kind of verification, I just want to make sure you distinguish between the two. One is that the conservation practices are taking place. The other is the shift in water quality. That is a programmatic verification; that is not an on-farm, onsite verification. It is the ambient water quality that gets monitored over time, whether it is through the CEAP program or whether it is through the State's ambient water quality monitoring. That is at a programmatic level and not on a trade by trade level.

Senator CARDIN. Mr. Hawkins, you can respond to that. I was going to ask you.

Mr. HAWKINS. Very quickly, and I certainly understand that we want flexibility with States. But at an enterprise that might be purchasing credits, I think a bottom line, uniform, you at least must do these three steps. There might be additions that States ask, so that when we are buying in the market, we know that no matter where we are buying from, or where the credits are coming from, there is going to be uniform baseline of how we establish that we know we are getting the credit we think we are buying, if we are purchasing them, rather than needing to verify any particular place that there is a baseline that we can count on across a multi-State Bay.

Senator CARDIN. That is the question I was going to ask. You have to deal in an interstate program, located in the District.

Mr. HAWKINS. Correct.

Senator CARDIN. There is not enough in the District, you are going to need to have multiple jurisdictions that you have to deal with, which requires, I think, some degree of Federal role.

Mr. HAWKINS. To me, it is not one way or the other. The advantage of some baseline uniform system is across the board why many, in my judgment, environmental programs have succeeded or failed. You get economies of scale, you get consistency of purpose, you get a professional group that can go from one place to another and know that there is a common set of steps that can be taken. Nonetheless, in a particular State or with a particular agricultural industry, it may be modified in addition to that. But knowing there is a baseline, so if you are buying on the market, you have confidence that where the credits are coming from, you know that there is a core that you can rely on, I think it would be important for the purchaser of the credit.

Senator CARDIN. I agree with that. Dr. Matlock, did you want to add?

Mr. MATLOCK. What we are talking about here is watershed level adaptive management, where we have the flexibility to evaluate

what works, implement it, change what doesn't work, but do it without penalty, do it transparently, do it in the open, eyes open. Ms. Bodine laid it out very effectively, I think, you cannot manage practices, you have to manage outcomes. The outcomes are water quality. If the water quality is getting better, we are doing things right. Let's figure out what is working best and keep doing it. Let's fix what is not working so well.

If the water quality is not getting better, we have to change something. So we have to have flexibility for that sort of adaptation in our process. Monitoring should be focused at the watershed level, not at the farm level. There are a number of reasons for that; it is too expensive, it breeds uncertainty, you are chasing ghosts all the time, because what happened yesterday won't happen tomorrow. And trying to find causality is just difficult, if not downright impossible. It is better to manage process and measure outcomes.

Senator CARDIN. Let me ask one final question. That deals with hot spots. You have mentioned that. What can be done to prevent those that are making the efforts, don't want to be responsible for areas that are subpar, even though you may meet the TMDL standard, you may meet the overall standard. But how do you avoid the criticisms that you are letting polluters off the hook and affecting some communities much more adversely than we should?

Ms. MCGEE. I will take the first shot at that and others can hop in. Under the Clean Water Act, there are provisions both in the regulations and the law that says a permit cannot be issued that will cause or contribute to the degradation of water quality standards. Theoretically, it is there. How that is done, I think is the challenge. How would a permit writer who is going to issue permits, whether it is Mr. Hawkins' plant or an urban stormwater area, when they see a credit in a permit, how are they going to evaluate that, what does that look like?

We are actually hopeful that EPA, they have provided some guidance in their Tool Kit, but we think more clarity needs to be given in that regard, there needs to be sort of a stepwise process. You would look, for example, at local impairments, local problems with waters and how that might affect your ability to trade. So we think one way to do it is to lay out a very methodical process, so that is transparent and then people can evaluate it for themselves.

Senator CARDIN. Ms. Bodine.

Ms. BODINE. I agree with Dr. McGee, a localized impairment of water quality is not allowed under the statute. But I would say that I think that this hot spot issue, when you are talking about nutrients, is a bit of a red herring. Hot spots, when a pollutant is a bioaccumulative toxic, yes, hot spots are an issue. Nutrients, though, you have to remember, are already so variable. The effect of nutrients in particular water bodies is variable with respect to temperature, water velocity, habitat. The issue that you would have a local hot spot as a result of a trade I personally view as highly unlikely. And it would have to be an extreme situation that a permit writer would be able to identify. So I know it is being thrown out there as a concern, but I would suggest it is not as big a concern as perhaps it is being portrayed.

Senator CARDIN. Thank you all very much. Senator.

Senator BOOZMAN. Thank you, Mr. Chairman.

Mr. Hawkins, you mentioned that you are in a situation to go from five to four and it is going to cost you a billion dollars. And yet it has really become very, very questionable that you are going to get a billion dollars' worth of bang for the buck in that reduction. Is that correct?

Mr. HAWKINS. Measuring the value of the pounds is a harder question to answer. There is no question that the cost per pound of removal has gone up.

Senator BOOZMAN. But when you put that in relation to the watershed, you mention the 1 percent, 2 percent affecting, when you put that billion dollars in relation to what five to four is actually going to do to the watershed, if you figure that out, it is really pretty minimal, isn't it?

Mr. HAWKINS. It is easy to argue that you could spend half as much money and get twice as much reduction.

Senator BOOZMAN. That is my point. A billion dollars is a lot of money. And there is no assurance that they might not come back a few years from now and say, you need to go from four down to three or two or whatever. But to take that billion dollars and then again put it with all kinds of other projects that would directly relate to the watershed, working with Dr. McGee or whoever, that to me makes no sense at all. And that is the problem, I mentioned the uncertainty, Dr. Matlock mentioned the uncertainty, and you live with this every day, Mr. Hawkins.

How do you, and you guys can chime in, Dr. Matlock and Mr. Hawkins, if we talk about a wastewater plant doing some sort of trading scheme or whatever, how do you get some certainty in the system through maybe going to a new permitting system? How do you get where they can do that?

The other thing is, I would say, in hearing your testimony, I know you come from the perspective of the large district, and you have a tremendous job to do, and you are doing a great job with it. But the scenario that you are giving is going on all over America. It might not be a billion dollars, but if you live in a town of 1,500 and it is $10 million, it is a big deal.

So we have to get a handle on this. There has to be some sort of common sense and scientific backing as those decisions are made. That is a whole different topic.

But talk to us about how, if we enter into this game, you and Dr. Matlock, how do you come up with some new permitting system so you can have some certainty, so you are not going to come back and essentially not only perhaps do your trading scheme, and then again the demand, it should go down to four to three, with the trading scheme, and you have all this other stuff in place, too?

Mr. HAWKINS. It is a great question. In our judgment at D.C. Water, by the way, you are exactly right, proportional to the community, ours happens to be quite large, but the cost relative to smaller towns may be just, per capita, the same kind of extremely high cost for protections at the margin. That is an issue, and I agree with Senator Cardin that at some point the public rebels and all of a sudden does not support any longer which is otherwise such a positive step, which is what Blue Plains has done for the last 4 years. It is an enormous success. We all should celebrate it.

As I have said, the best bass fishing in the Potomac River is downstream from our plant.

[Laughter.]

Mr. HAWKINS. That is amazing. But the question, and this is what it goes back to, where I think we all agree that having a system with rules set up that are understandable and clear, it is why at least at the moment, absent having seen something otherwise as a potential prejudicer, if there is a baseline system, the Federal Government doesn't necessarily have to run it. But that there are some baseline circumstances that we know will be firm and certain across the watershed, even with watershed monitoring, a well-run watershed association, I agree with that approach, there could be flexibility in each State.

And that does call for some principles that are established, that are very clear from the onset. I don't think the market will work. We wouldn't want to put ratepayer money into the market unless we are certain that we can count on those reductions wherever they may be coming into the future. That is going to be the market rules, as opposed to what we can or can't do.

Senator BOOZMAN. Dr. Matlock.

Mr. MATLOCK. So the common thread here is that there needs to be some baseline "thou shalt nots" on the landscape. There are standard practices that are acceptable for agricultural producers, whether it is row crop, animal ag, specialty crop, et cetera. We all understand those in the ag community very well.

We also understand that the Pareto principle works. Sometimes 90 percent of our problems come from 10 percent of our landscape. So we have tools to evaluate where our problem children are, as it were. That sounds paternalistic, it is not intended that way. Probably a poor choice of phrase. But we understand where the biggest possible impacts could be met through implementation and intervention with the landowners' and ag producers' participation.

So we need a set of baseline practices, the first three or four tiers of activity that must be certain. You turn the manure spreader off when you go across the creek. There are some things you can do that just make sense. And all good producers know that. We need some level of assurance that those practices are being implemented.

But you can't do that through a command and control system. Part of this is just helping each other become better neighbors through more transparency and higher communication and understanding. Frankly, the monitoring will tell ultimately where the problems persist. Monitoring at the watershed level, not at the edge of field level, because it is just too expensive. But you can cascade up to the field level if you have persistent problems in an area.

So you can have triggers for engagement. So simple threshold triggering of response system, which is consistent with adaptive management strategies, makes sense. That way you start with a broad stroke, broad approach within the watershed and then you focus where you need to, as you need to. Because the other challenge we have, as you alluded to and Mr. Hawkins responded to, is the targets may change. Because our watersheds are always changing. And as our targets change, and today we are trying to

hit 37 parts per billion total phosphorus in the Illinois River in Oklahoma and Arkansas, it might be 20 next year. We have to have the tools to adapt there too.

Senator BOOZMAN. Let me ask Dr. Matlock and Ms. Bodine about a lot of our States have narrative nutrient criteria. Is it possible to do a trading program to set it up in a State like that and have the narrative nutrient criteria of water quality?

Ms. BODINE. Definitely yes. Most States still have narrative criteria. EPA has been pushing States to adopt numeric and some are resisting that. So water quality based effluent limitations are based on meeting water quality standards. That is a determination that is made in the receiving water, in the river or stream, in the ambient condition of the river or stream. Even outside of trading today, yes, water quality based effluent limitations are placed in permits, where they interpret the narrative. EPA has models that would support the interpretation of a narrative into a number, and then it becomes simply a number that could be traded.

The other way of looking at it, though, is in determining whether or not you need a limitation on that plant, because you only have a water quality based effluent limitation if the discharge has a reasonable potential, and I am using all kinds of Clean Water Act terminology here, but a reasonable potential to contribute to a violation of a water quality standard. And if that reasonable potential is removed because you have trading, because the nutrients are being addressed elsewhere, then that is another way you can address it in the context of a narrative as opposed to a numeric water quality standard.

Senator BOOZMAN. Dr. Matlock.

Mr. MATLOCK. Yes, echoing what Ms. Bodine said, yes, narrative criteria can be effective in a nutrient trading framework for establishing some end point. But ultimately you have to have some end point and that ultimately goes to something you can measure. So whether it is algal biomass accumulation or whether it is turbidity or some other surrogate for that narrative criteria, ultimately it goes to a number. Because we manage for numbers. Otherwise it is too subjective.

Senator BOOZMAN. Anybody that knows, what is the ratio of States now that have narrative versus a numeric? Do we have any idea? Half or two-thirds? Aha, I have stumped the panel.

Ms. BODINE. You have stumped us. But many more States have narratives than have numeric standards. And you have seen the controversy in Florida over numeric standards.

Senator BOOZMAN. Thank you, Mr. Chairman.

Senator CARDIN. Let me thank all of you. This has been an extremely helpful panel in understanding the technical and the practical problems. My local paper today had headlines concerning water rates locally. It is becoming more and more a political issue. One of my first introductions to the people of Smith Island, which is about 350 people that live on the last inhabitable island in the Chesapeake Bay was how we were going to take care of their water needs. And we did. But Mr. Hawkins, my guess is that the costs there are about the same per capita as what you were dealing with to get that marginal progress made.

So we have a responsibility to find the most efficient ways to accomplish our objectives. I think that is what the public is demanding. We are going through a lot of budget debates, but they want us to do our job in the most cost-effective way.

I understand the suspicions that are out there, and that is why I think the Federal Government does have a responsibility to give the predictability that you all are talking about, so that you know, A, that the results will be there and B, that the market is fair and that people want to participate, because it is the right thing and it is going to create a fairer system and a more cost-effective system.

Our States are doing it, and I think EPA is cooperating and it is working. But as has become apparent by the testimony today, we can make this more effective. I think that is what this hearing has helped us focus in on. I thank you all for your participation. As I mentioned already, Senator Boozman and I are working very closely together to try to see where we can work in a non-partisan way to advance a good policy. This is one area that we will certainly be looking at.

Before we adjourn, without objection, we will introduce statements from the Virginia Conservation Network, Conservation Pennsylvania, the National Association of Clean Water Agencies and the Chesapeake Bay Nutrient Land Trust, LLC. We have statements for the record from all those groups that will be included in the record. Thank you.The Subcommittee is adjourned.

[Whereupon, at 3:52 p.m., the Subcommittee was adjourned.]

[The referenced material follows:]

VIRGINIA CONSERVATION NETWORK

5/22/2013

The Honorable Benjamin L. Cardin, Chairman
Water and Wildlife Subcommittee, Environment and Public Works
509 Hart Senate Office Building
U.S. Senate
Washington, DC, 20510

Dear Chairman Cardin,

On behalf of the Virginia Conservation Newtwork (VCN), I would like to offer these brief comments for the Nutrient Trading and Water Quality hearing scheduled for 2:30 PM May 22, 2013 in the Water and Wildlife Subcommittee.

First, I'd like to thank you for your interest and commitment over the years to water quality in the Chesapeake Bay and elsewhere. This hearing on nutrient pollution trading is certainly a testament to that commitment. These programs have the potential to make necessary pollution reductions more achievable. I would, however, like to caution against moving forward too quickly. Expansion and implementation of current programs must be done carefully and with consideration of a number of issues to avoid the development of improperly designed programs that result in further degradation or increased uncertainty of pollution reductions.

VCN has and will continue to work in Virginia to help design a program that achieves its goals without sacrificing local water quality. For your reference I have included a copy of our most recent "Nutrient Pollution Trading" whitepaper. It covers our concerns and objectives as Virginia goes through the regulatory process of expanding its trading program. We have also been actively engaged with the Choose Clean Water Coalition and have been following the development of other state trading programs in the Chesapeake Bay watershed. The Coalition has developed "Principles for Nutrient Credit Trading", also attached, which addresses our issues of concern from a more regional perspective.

There are programmatic components within existing state programs, like Virginia's, that are still being developed or are widely recognized as being deficient, as is the case with Pennsylvania's baseline determination. This makes it hard to ascertain if baseline reductions are achieved, local water quality is protected, verification protocols are sound, or even if programs result in net improvements to water quality. As you know, the Environmental Protection Agency will be issuing a series of technical memoranda on various aspects of the state programs in an effort to address some of these questions. We are supportive of this approach and will continue to engage with the agency on this process. Following their issuance, state programs may need time to respond, and address shortcomings. Unfortunately the process is behind schedule already and federal legislation regarding nutrient trading offered now would only slow it further.

Virginia Conservation Network
422 East Franklin Street, Suite 303 Richmond VA 23219 * 804-644-0283 * vcn@vcnva.org

Particularly, legislation envisioning an interstate trading framework would be premature at this time. Before developing appropriate verification procedures and environmental protections necessary for interstate trades to be effective and fair, state programs need to be finalized and fully functioning. If at some in the future an interstate trading framework is developed, federal rules should ensure that the most protective standards are applied.

Once again thank you for your leadership on water quality protections over the years and your continued interest in nutrient pollution trading as a means to achieve it. I hope that the Nutrient Trading and Water Quality hearing is successful and informative for you and the subcommittee. However, I urge you to proceed with caution in the development of federal legislation, and avoid any proposals regarding an interstate trading framework at this time.

Sincerely,

Jacob Powell
Policy and Campaigns Manager, Virginia Conservation Network
804-644-0283
jacob@vcnva.org

Principles for Nutrient Credit Trading

September 2012

Use of nutrient trading in the region must ensure that water quality is protected or improved, especially as more nonpoint and nontraditional sources become involved.

Nutrient credit trading in the Chesapeake Bay watershed could make meeting the reductions required in the Chesapeake Bay Total Maximum Daily Load (TMDL) more easily achievable by 2025 because of the reduced cost of compliance. In addition, it provides a framework to track and offset loads of pollution from new development and sewer/septic systems. However, improperly designed programs increase the chances of water quality degradation which ultimately means failure to meet water quality goals – an unacceptable outcome.

There is currently much discussion about nutrient trading, especially since individual Bay watershed states have included trading as a way to meet and maintain their pollution allocations under the TMDL. Nutrient trading programs depend on viable markets to achieve the necessary reductions in water pollution. Strong regulation and the threat of enforcement are drivers for the robust generation of credits, which is a precondition for successful water quality markets. If trading occurs, it is critical that the evaluation of practices and reduction credits are based on sound science and consistently applied. Members of the Coalition's TMDL workgroup have identified the following principles that must be meaningfully incorporated into any trading program.

1) **Water quality must be protected or improved.** Local water quality and uses must not be sacrificed or degraded for any trade. There must be a standardized process for evaluating proposed trades to ensure that they do not degrade local water quality. In the case of offsets for new loads, there should be an "upstream reduction policy" where credit sellers are located upstream of credit buyers.

2) **Minimum criteria must be met to trade.** Credits may be created only through measures which go beyond a baseline performance level needed to achieve compliance with all applicable water quality standards and TMDLs. Only credits from projects that are "additional to" the legally required measures represent a net environmental benefit. Baselines for non-point source credit generators must include implemented management practices that provide reasonable assurance that they will do their fair share of achieving and maintaining compliance. States must provide a clear demonstration that their baseline definition is consistent with these requirements. These principles apply regardless of whether a water quality standard is expressed in numerical or narrative terms.

3) **Accountability, transparency and verification are essential.** A public process for reviewing, commenting on, and challenging credit-generating proposals during the certification process is critical. The methodology used to estimate credits should be clear and transparent.
    - Permits that allow for a nutrient credit trading option must have terms and conditions that clearly state the permittee's obligations regarding the use of the credits, provide assurance of actual reductions by the seller to meet effluent limits in the buyer's permit and include clearly enforceable terms.
    - Credit generating proposals must be verified by a government agency or an independent third party. Monitoring and verification procedures must ensure that any credits which are traded or transferred result in real, verifiable and durable pollution reductions. This information must be publicly available in the annual or monthly discharge monitoring reports of the permittee.

4) **Trading programs must address the differences in the value of credits.** Trading programs must account for differences in the relative value of credits stemming from effectiveness uncertainty, locations of the respective facilities, and other relevant factors. This is particularly critical when reductions to point sources that would typically be measured at the outfall are traded away for non-point management practices which currently have no associated quantitative monitoring assurances.
    - Uncertainty ratios[1] account for the multiple types of uncertainty that occur with pollution reductions from non-point sources relative to the point sources (*e.g.,* wastewater treatment plants and industrial dischargers). Virginia has established a 2:1 ratio for trades involving nonpoint sources – this should be supported and maintained. Other Bay jurisdictions that have not adopted policies adequately addressing uncertainty, should - at a minimum - adopt uncertainty ratios for management practices that reflect the degree of scientific confidence in the associated pollution reductions and the ease of verification.
    - Delivery ratios account for differences in location between buyers and sellers that will impact the amount of pollution delivered to the tidal waters. State nutrient trading programs currently have adopted the delivery ratios used by the Chesapeake Bay Program. We support this approach.

5) **Trading programs must result in actual net improvements to water quality.** There are several tools available to do this through ratios. Retirement ratios require a permanent retirement of a portion of all credits. For example, Maryland requires that 5% of credits generated by point sources, and 10% of credits generated by nonpoint sources, be retired. We believe this is an

[1] This uncertainty stems from difficulties in measuring pollution reductions from nonpoint source management practices and includes: the degree of confidence that they are properly implemented and maintained; the amount of scientific information supporting the estimates of pollution reductions; and, the effects of weather-related variability on their performance.

appropriate approach. Credit retirement is a useful and strongly recommended tool to achieve net water quality improvements.

6) **Credits used to offset loads associated with new development should be permanent.** To ensure the necessary duration of the credits used to offset the new source, the contract between the trading parties should contain a legally enforceable requirement that the management practices which generate the credit, or other management practices which will yield the same or greater amount of nutrient reduction, must be maintained in perpetuity, or so long as the nutrient discharge-generating activity is being conducted.

7) **Trading programs should ensure that credits are generated recently.** To ensure the integrity of the trading program, when credit generating measures were implemented prior to the proposed trade, their implementation should have been recent.

8) **Trading programs should ensure the credit generator is not compensated twice for the same credit-generating measures.** A trading program should not allow a pollution reduction measure which has been paid for by a government agency (except for the purpose of generating a nutrient credit) to be sold as a "credit" without making appropriate provision for reimbursement of the government agency sufficient to avoid a "double recovery."

9) **Projects that substantially increase impervious surface should not be eligible to generate credits.** For example, the conversion of farmland to residential, commercial or industrial development should be ineligible for trading credits. Credits should not be allowed which would either (1) result in a net increase in impervious area at the site generating the credit (unless potential runoff is prevented or substantially mitigated as part of management practices) or (2) result in an increase in sediment releases from the site generating the credit, absent exceptional and compelling circumstances.

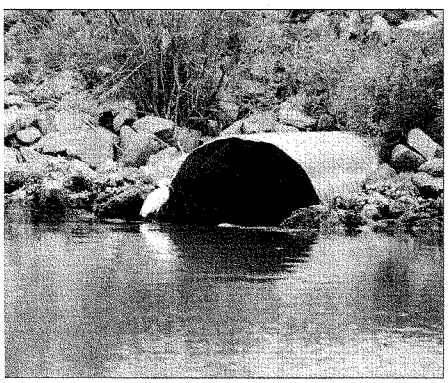
10) **Trading programs can be developed to support smart growth.** Trading ratios, discussed above, could also be used to promote smart growth by reducing them when using existing infrastructure and increasing them when new infrastructure is required.

NUTRIENT POLLUTION TRADING

Authored by: Jacob Powell

Statement of Issue

Virginia has operated a nutrient pollution trading program since 2005, but in 2012 a law was passed expanding the program in an effort to meet the reductions required in the Chesapeake Bay Total Maximum Daily Load (TMDL) at reduced cost of compliance. This expansion carries both potential opportunities and concerns. As regulations are now being drafted to promulgate this expansion it is important to ensure they uphold the delivery of verifiable, enforceable, and cost-effective pollution reductions that restore and protect water quality consistent with the federal Clean Water Act.



Background

Pollution trading is a market-based strategy intended to more rapidly and cost-effectively meet environmental quality goals. Trading programs establish permanent pollution goals, or "caps," for sources of pollution. The program then allows one source (the "buyer") to meet their regulatory obligation by paying another (the "seller") who has reduced its discharge below their own cap. Trading may involve either the acquisition of "credits" to help *comply with a permit cap*, or the acquisition of "offsets" to compensate for new pollution that *exceeds a cap*. Trading allows flexibility to capitalize on differential efficiencies (economic, physical space, time, etc.) among and between sources to help meet pollution goals more effectively. Trading is a supplement to traditional regulatory (e.g., "end-of-pipe" limits) and non-regulatory (e.g., federal "cost-share" programs) means to control pollution.

The 2005 Virginia General Assembly established the first pollution trading program in Virginia. It created the Chesapeake Bay Watershed Nutrient Credit Exchange Program (SB 1275, §62.1-44.19:12) to help "point sources" (i.e., municipal and industrial wastewater treatment facilities) meet Chesapeake Bay nitrogen and phosphorus reduction goals in the most cost-effective manner and help the commonwealth accommodate new facilities that support economic development without harming water quality. This program allows point sources to acquire credits from other point sources to comply with assigned nutrient loading permit caps *and* acquire offsets from point and nonpoint sources (such as farmers, private landowners) to compensate for pollution loads from a new or expanding facility that exceeds a cap. This program is focused on meeting and maintaining "aggregate" nutrient pollution loading caps in each of the five large river basins that make up the Bay watershed in Virginia, rather than individual facility load caps. The premise here is that the total nutrient loading drives the current water quality impairment in the tidal rivers and the Bay.

In 2009, the General Assembly authorized a statewide Nonpoint Nutrient Offset Program (HB 2168, §10.1-603.8:1) to help new development activities meet the "no-net-increase in pollution" goal included in stormwater regulations that will take effect in 2014. Offsets acquired from point or nonpoint sources may be acquired to meet this regulatory requirement when on-site practices cannot practicably achieve necessary pollution reductions. A preference for offsets within the local watershed (8-digit Hydrologic Unit Code) is also included. Legislation in 2011 (SB 1102, §62.1-44.19:15D) prescribed some rules for the generation of credits or offsets by animal waste-to-energy and waste reduction projects.

Virginia's Watershed Implementation Plan proposed a role for an expanded nutrient trading program in meeting the Bay TMDL. In particular, it envisioned using trading to help achieve pollution reduction goals and address growth from challenging pollution sources, such as from existing urban

NUTRIENT POLLUTION TRADING RECOMMENDATIONS

Provided below are principles and recommendations to assist in the evaluation of any nutrient trading legislation advanced in the 2012 General Assembly session. These items address rules that should be maintained in the existing program, as well as new concepts that could move forward in legislation.

* Protection of local water quality must be paramount. Specifying how compliance with "local water quality limitations," an existing statutory requirement, will be measured and achieved is a critical part to any successful trading program. Trades should be regulated so that no transaction will harm local waters.

* Only credits or offsets that constitute quantifiable net pollution reductions may be traded. The existing requirement in statute that new or expanding point sources may only acquire nonpoint source offsets generated by the installation of best management practices that exceed a specified "baseline" level of performance must be maintained. The baseline represents the amount of reductions a source is expected to achieve under the total maximum daily load before it can generate credits by doing more than required.

* Point sources that choose to acquire nonpoint source offsets must acquire two pounds of nonpoint source reduction for every pound of reduction they are seeking to offset. As more trades involve nonpoint sources such as farm best management practices, it is imperative that Virginia maintains the 2:1 trading ratio that currently exists for trades that include nonpoint sources.

* The trading program must be transparent to the public, subject to appropriate verification, enforcement, and provide a reliable and transparent method for determining how new and emerging pollution reduction technologies are allowed to enter the trading marketplace. Making Virginia's program more transparent and open to the public to see what trades and offsets are being offered and made will improve the public's acceptance of the trading program. Virginia should establish a rigorous review process based on the best available science to assist the agencies in making these determinations.

development and septic systems built in the past without adequate pollution controls.

Nutrient trading in Virginia has promise, particularly in its potential to deliver pollution reductions at a reduced cost. However, expansion of the program must be done carefully and with consideration to a number of issues and principles such as those outlined in the recommendations section so as to avoid the development of an improperly designed trading program that would result in further degradation or increased uncertainty of pollution reductions. Without appropriate rules, elements of an expanded nutrient trading program could (1) fail to meet its goal of assisting the Bay cleanup, (2) negatively impact local water quality, or (3) run afoul of federal Clean Water Act programs that underlie all state water quality programs.

Careful consideration and review of any future legislation is critical to ensure Virginia maintains a nutrient trading program that will help meet water quality goals, reduce costs, provide accountability and transparency and offer surety for participants that the program can withstand legal scrutiny.

Conservation Pennsylvania

Testimony of Kim Snell-Zarcone on behalf of Conservation Pennsylvania
Regarding Nutrient Trading and Water Quality
Before the Subcommittee on Water and Wildlife
May 22, 2013

My name is Kim Snell-Zarcone and I am the Policy Director for Conservation Pennsylvania, which is an environmental advocacy organization dedicated to improving the health of Pennsylvania's local waters along with the larger Chesapeake Bay. I participate on a number of state and federal workgroups whose charge is to make decisions related to water quality, including the Water Quality Goal Implementation Team of the Chesapeake Bay Program, the Agricultural Workgroup of the Water Quality Goal Implementation Team of the Chesapeake Bay Program, and the Trading and Offsets Workgroup of the Water Quality Goal Implementation Team of the Chesapeake Bay Program. As a member of these and other workgroups, I have had the opportunity to be involved in many discussions about Pennsylvania's nutrient credit trading program and the prospect of an interstate trading program in the Chesapeake Bay Watershed.

Pennsylvania, along with Maryland and Virginia, are in the process of revising their nutrient credit trading programs in light of EPA's requirement that the programs satisfy the mandates of the Chesapeake Bay Total Maximum Daily Load. These revisions are long overdue and Conservation Pennsylvania is optimistic that meaningful revisions to baseline requirements will be included as part of a revised program. Conservation Pennsylvania has also pushed for a more site-specific evaluation of compliance with the Bay TMDL requirements as part of the revised Pennsylvania nutrient credit trading program. While Pennsylvania seems committed to these revisions, the Commonwealth continues to wait for guidance from the Environmental Protection Agency about the types of changes necessary to satisfy the mandates of the Bay TMDL. While EPA is right to be thoughtful about what specifically it would like jurisdictions to change within nutrient credit trading programs, it has been very slow to release the Technical Memoranda that will provide the necessary direction.

Conservation Pennsylvania encourages this Subcommittee to be supportive of the EPA process that is underway to revise state nutrient credit trading programs to ensure compliance with the Bay TMDL. However, the Subcommittee should encourage EPA to involve environmental and water quality stakeholders in discussions related to the Technical Memoranda much earlier in the process. Currently, stakeholders are given an opportunity to comment on a draft Technical Memorandum after EPA and jurisdictions have completed their negotiations. Environmental and water quality stakeholders have complained that this process brings their input into the discussion at the eleventh hour and does not adequately allow for its integration into the Technical Memoranda.

Conservation Pennsylvania also encourages this Subcommittee to request that EPA meet the established timeline for release of the Technical Memoranda. Jurisdictions have shown a commitment to revising

2707 Yale Avenue
Camp Hill, PA 17011
www.conservepennsylvania.org

Conservation Pennsylvania

their individual credit trading programs. However, these programmatic revisions cannot move forward in an efficient and meaningful way until EPA provides the necessary guidance through final versions of the various Technical Memoranda. In recent months revisions to state programs have come to a halt in order to ensure that they are not ultimately in conflict with EPA requirements as established in the Technical Memoranda. Pennsylvania's fledgling nutrient credit market has virtually collapsed as credit purchasers no longer have faith that credits will meet the stringent requirements of their NPDES permits. Additionally, credit sellers are collecting a paltry sum for the credits they have sold. In short, the Pennsylvania nutrient credit trading systems needs revived quickly if it is to survive. Pennsylvania's program cannot be effectively revised until EPA fully details how Bay TMDL requirements can be satisfied through the Technical Memoranda. Thus, the timely release of the Technical Memoranda is of utmost important to salvaging Pennsylvania nutrient credit trading program.

While many environmental and water quality stakeholders are interested in expanding nutrient credit trading programs across state lines, most advocates understand that a level playing field must first be established by EPA. Thus, it is appropriate for EPA to try to create uniformity among and between the existing nutrient credit trading programs in the Bay Watershed before interstate trading is allowed. Through the process that is underway, EPA is attempting to lay a foundation for state trading programs that makes a pound of nitrogen in Pennsylvania comparable to a pound of nitrogen in Maryland or Virginia. Ultimately, an interstate trading program will organically grow from strong state trading programs. Conservation Pennsylvania encourages this Subcommittee to hold off on legislative proposals related to interstate trading of nutrients and sediment until after the jurisdictions in the Bay Watershed have had an opportunity to revise and modify their trading programs to conform to EPA's nutrient credit trading Technical Memoranda.

In summation, Conservation Pennsylvania encourages this Subcommittee to support EPA in its endeavors to release the nutrient credit trading Technical Memoranda in a timely manner while allowing for more meaningful participation in the drafting process by environmental and water quality stakeholders.

Thank you for providing Conservation Pennsylvania with the opportunity to present testimony on the important topic of nutrient trading and water quality.

2707 Yale Avenue
Camp Hill, PA 17011
www.conservepennsylvania.org

NACWA
A Clear Commitment to America's Waters

Written Statement for the Record

National Association of Clean Water Agencies (NACWA)

Nutrient Trading and Water Quality

Committee on Environment and Public Works
Subcommittee on Water and Wildlife
U.S. Senate
May 22, 2013

The National Association of Clean Water Agencies (NACWA) is pleased to have the opportunity to submit for the record this written statement to the Senate Subcommittee on Water and Wildlife on the occasion of the Subcommittee's hearing entitled, Nutrient Trading and Water Quality" held on May 22, 2013.

NACWA represents the interests of more than 350 municipally owned wastewater treatment agencies and organizations. Our members are dedicated environmental stewards who treat and reclaim more than 18 billion gallons of wastewater each day while working to carry out the goals of the Clean Water Act.

America's wastewater sector is in need of serious attention. The U.S. Environmental Protection Agency (EPA) estimates repairing, replacing, and upgrading aging wastewater infrastructure will cost between $300 billion to $1 trillion over the next 20 years[1]. Municipalities currently shoulder approximately 97% of the cost of clean water infrastructure projects, and face an immediate backlog of over $40 billion. To meet their current clean water challenges and existing debt obligations, clean water utilities have raised rates by more than double the rate of inflation over the last decade. Today, 40% of households across America are already paying more out of their disposable incomes for wastewater management than EPA says is affordable.

In addition to this growing investment need, EPA regulations on wet weather related discharges, biosolids management, and nutrients under the 1972 Clean Water Act (CWA) have expanded, leading to more expensive levels of wastewater treatment. Given the current economic environment and federal budget shortfall, publicly owned treatment works (POTWs) are struggling to make the necessary upgrades to protect public health and the environment without going bankrupt or increasing rates to unsustainable levels.

For over 40 years, members of the National Association of Clean Water Agencies (NACWA) have been at the crux of this challenge, pursuing national policies and approaches that seek to stretch every ratepayer dollar as far as possible in order to ensure that the nation's waters are clean and safe, and meet the strict requirements of the CWA. Water quality trading is one such approach, and in 2012 NACWA formed a Water Quality Trading Working Group to provide a utility perspective on whether trading can achieve more efficient water quality improvements than traditional regulatory approaches.

The Nutrient Challenge

Excessive amounts of nutrients, primarily nitrogen and phosphorous, in waterways now represents the single largest pollution problem facing our nation's waters. More than 60 percent of the rivers and bays in every coastal state are moderately to severely degraded by nutrient pollution, and nutrients are contributing to some of the largest algal blooms, fish kills, shellfish poisonings, and aquatic deadzones in the country[2]

[1] EPA, "2008 Clean Water Needs Assessment Survey".
http://water.epa.gov/scitech/datait/databases/cwns/2008reportdata.cfm
[2] "Nutrient Pollution of Coastal Rivers, Bays, and Seas." Issues in Ecolog. 2000.
http://cfpub.epa.gov/watertrain/pdf/issue_7.pdf

Effluent discharges from POTWs are a significant source of nutrient pollution in surface waters. As a result, EPA has increased its focus on controlling nutrient discharges from these sources. Yet POTWs are not the only nor the greatest source of nutrient pollution in many waterways. Runoff from agricultural land, rich in nutrients from fertilizer and livestock manure, is responsible for more nutrient pollution than any other source. Despite this, most agricultural producers are exempt from the water pollution control requirements of the CWA.

This leaves the brunt of the work to mitigate nutrient pollution to the POTWs, who rely on expensive technology controls and upgrades to reduce their nutrient loadings. While these utilities strive for compliance, there are two problems with this model. First, nutrient removal technology is extremely expensive. In the Chesapeake Bay for example, EPA recently issued a permit to the Blue Plains Wastewater Treatment Plant in Washington, D.C.requiring a further reduction in effluent nitrogen from just over 5 million to 4.7 million pounds per year. This nitrogen removal project will incur a capital cost of $900 million to ratepayers yet only result in a 0.4% reduction of total nitrogen flowing into the Chesapeake Bay.[3]

And second, even if a utility is able to completely remove the nutrients from its discharge, it may not lead to sizable reductions in overall nutrient loads in waterways and improvements in water quality. In the Midwest, nutrient pollution in the Mississippi River is responsible for a deadzone in the Gulf of Mexico that measures almost 3,000 square miles. Yet, POTWs are only responsible for 12 percent of the phosphorous and 9 percent of the nitrogen delivered to the Gulf, compared to agricultural and range land, which is responsible for 80 percent and 71 percent respectively.[4]

Clearly, there is a disconnect between current water quality management and implementation practices and what is needed to improve water quality. Instead, a more holistic approach to watershed management should be adopted to collectively engage and address all sources and activities contributing to nutrient pollution.

Water Quality Trading to Address Nutrient Pollution

Water quality trading continues to gain interest among industry and agricultural producers as a viable market-based alternative to control water pollution. This approach is based on the idea that pollution sources in a watershed face very different costs to control the same pollutant. Therefore, permitted emitters like POTWs with high abatement costs could purchase equivalent nutrient reductions from a cheaper source, like agriculture, to help meet their regulatory requirements.

There are three main benefits to water quality trading: First, water quality trading has the potential to meet nutrient load requirements at lower overall costs. The cost to remove a pound of nitrogen or phosphorus from farm runoff and drainage is typically 4 to 5—and sometimes up to 10 to 20—times less than the cost to remove the same amount from municipal wastewater or stormwater.[5] Second, the economic incentive created for farmers who engage in nutrient management activities means that water quality trading can potentially generate environmental

[3] George Hawkins, ""Testimony on EPA's Integrated Planning Framework before the House Transportation and Infrastructure Committee, Subcommittee on Water Resources and the Environment". July 25, 2012.
[4] U.S. Geological Survey, "Sources of Nutrients Delivered to the Gulf of Mexico". Jan. 2008. http://water.usgs.gov/nawqa/sparrow/gulf_findings/primary_sources.html
[5] NACWA, "Controlling Nutrient Loadings to U.S. Waterways: An Urban Perspective". Oct. 2011. http://www.nacwa.org/images/stories/public/201-01-06wp.pdf

benefits beyond those that would be achieved under traditional regulation, like wildlife habitat and floodwater control. Finally, water quality trading helps move water quality control efforts towards a watershed-based approach, collectively addressing all sources and activities contributing to watershed degradation.

Many POTWs who are stretched beyond the brink of their financial capacity find water quality trading appealing. The approach addresses the lowest hanging fruit in terms of nutrient reduction, saving utilities money, engaging sectors that may not otherwise participate in nutrient reduction activities, and encouraging water quality improvements that go above and beyond minimum pollution control requirements.

Updating EPA's Water Quality Trading Policy

According to EPA, there are currently 49 water quality trading programs active or under development in the U.S.[6] Of those, less than half include trading between utilities and agricultural and fewer still are geared specifically towards addressing nutrients. If the environmental and economic benefits of adopting a market-based approach to meet nutrient requirements are overwhelmingly positive, why haven't these markets been more readily adopted?

Successful water quality trading programs depend on quite a few factors. These include the ability to establish and enforce a pollution cap, handle the complexity associated with establishing verifiable agricultural credits, and avoid the creation of hot spots, or localized areas with high levels of nutrients within a watershed. Equally important is the need for more consistent support and greater promotion of water quality trading from the federal government.

In 2003, EPA released its Water Quality Trading Policy to provide states and interstate agencies with guidance in developing and implementing water quality trading programs. This Policy is the first time EPA has recognized water quality trading as a viable approach to reducing certain types of water pollution. Its release signified a broader shift in environmental policymaking from top down strategies to one that fosters commodification and local ownership.

While it is certainly positive to see EPA endorse a market-based approach to nutrient management, NACWA has urged EPA to update the Policy and clarify language the Association fears could in fact limit trading and the broader establishment of regional water quality trading programs.

First, NACWA is concerned with how the Policy defines the areas under which trading may occur. According to EPA's Policy, "all water quality trading should occur within a watershed or a defined area for which a Total Maximum Daily Load (TMDL) has been approved." Under the CWA, a waterbody that fails to meet one or more of its designated uses is declared 'impaired' and a TMDL is developed, which allots a maximum amount of a pollutant the waterbody can receive and still safely meet water quality standards. TMDLs can certainly help facilitate trading as they define a trading area and establish a pollution cap for each pollution source. Nevertheless, NACWA fears EPA's Policy could be interpreted as only endorsing trading where a TMDL has been established.

[6] EPA, "State and Regional Trading Programs". http://water.epa.gov/type/watersheds/trading/tradingmap.cfm

Around the country, many segments of streams and rivers, lakes, and coastal waterbodies are facing enormous nutrient problems despite not being declared impaired or having a TMDL. Furthermore, implementing a TMDL is a cumbersome and, at times, contentious process. It requires setting a controversial pollution limit to be recognized by pollution control mandates on some or all pollution sources. In cases where agriculture is involved, translating broad mandates to individual producers and ensuring long-term compliance is especially difficult.

It is critical EPA recognize that trading can be just as effective, if not more so, in the absence of a TMDL. The Electrical Power Research Institute's (EPRI) Ohio River Basin Trading Project is one example of a voluntary nitrogen and phosphorous trading program not linked to a TMDL. In August 2012, EPRI launched the pilot phase of the Project, which covers parts of Ohio, Kentucky, and Indiana. It is the only active interstate trading program in the country and on its way to being one of the largest and most sophisticated water quality trading programs ever developed. To see the implementation of more programs like EPRI's, EPA should be receptive to water quality trading programs under a wide variety of circumstances.

And second, NACWA is concerned that requiring farmers to meet baseline requirements before they are eligible to generate credits for sale may hinder trading and the success of these programs. According to EPA, farmers must first comply with baseline, or pollutant control requirements, before they can be eligible to generate and sell credits. Baseline requirements take the form of best management practices (BMPs) that are consistent with the water quality goal.

Under the CWA, there are no requirements for agriculture to adopt BMPs even in the presence of a TMDL. By requiring that a set of minimum practice standards be met before credits can be generated, EPA is disqualifying the least costly reductions from being offered as offsets. Farmers who have not voluntarily adopted the minimum set of practices prior to the start of a trading program may not find it in their interest to enter the market because of the entry cost associated with meeting a complex baseline. Instead of putting late actors at a competitive disadvantage, granting farmers the ability to generate credits as they work to meet their baseline requirements holds the agriculture sector accountable while incentivizing greater nutrient reductions and a more liquid market.

Conclusion

Forty years after the passage of the CWA, POTW leaders around the country are transforming the way they deliver clean water services. At the heart of this transformation is the emergence of innovative approaches, like water quality trading, that can stretch ratepayer dollars, improve the environment, create jobs, and stimulate the economy.

But utilities cannot master this transformation alone. They need the support of Congress, who should promote greater adoption of watershed-based solutions by explicitly encouraging trading in the CWA. Similarly EPA should work with delegated states to promote viable and flexible trading programs. Doing so will give utilities the green light to engage in more nutrient transactions that can yield tangible water quality improvements while addressing the affordability concerns of POTWs around the country.

If you have any questions regarding this statement or NACWA's efforts in the water quality trading arena, please contact Hannah Mellman at hmellman@nacwa.org.

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Chesapeake Bay Nutrient Land Trust, LLC.

The Honorable Benjamin L. Cardin, Chairman
Subcommittee on Water and Wildlife
Senate Committee on Environment and Public Works

RE: May 22, 2013 Subcommittee Hearing "Nutrient Trading and Water Quality."

Dear Senator Cardin and members of the Subcommittee on Water and Wildlife:

Representing the Chesapeake Bay Nutrient Land Trust ("CBNLT"), I testified before the Subcommittee on Water and Wildlife August 3, 2009, hearing entitled "A Renewed Commitment to Protecting the Chesapeake Bay: Reauthorizing the Chesapeake Bay Program." The focus of CBNLT's testimony was on development of Virginia's nonpoint source nutrient trading program for stormwater compliance, related environmental and fiscal benefits, roadblocks to a robust nonpoint nutrient trading program, and suggestions for federal action. We offer the following comments to assist the Subcommittee on Water and Wildlife as it continues to consider nutrient trading opportunities and challenges, and how Congress can assist in the development of an appropriate nonpoint nutrient trading market.

CBNLT, with no state or federal financial assistance, developed the first nutrient "bank" in Virginia in 2006. It is important to note that nonpoint nutrient credits generated at a Virginia nonpoint nutrient bank represent nutrient reductions above and beyond those required or funded by state or federal law or Virginia's Bay TMDL Watershed Implementation Plan. In addition, Virginia's stormwater nonpoint nutrient trading law takes into account and clearly protects local water quality.

Since our 2009 testimony before this Subcommittee, we have developed two more banks in the Commonwealth. Other entrepreneurs have followed our lead and there are currently nine approved banks in the four major western shore Virginia Bay tributaries. These facilities represent an annual reduction of approximately 1,350 pounds of phosphorous and 4,500 pounds of nitrogen; however only slightly over 55 pounds of phosphorous credits have been sold and approximately 220 pounds of related nitrogen credits have been retired. Thus, while some nonpoint nutrient banks have developed, the market has been slow to follow. This is a testament to the willingness of the private sector to risk

investment; it also shows that there are market barriers that need to be overcome before significant additional private investment will be made and progress can be made toward addressing the Bay's nutrient issues.

CBNLT has been the leader in developing Virginia's legislation for stormwater nutrient trading, has interacted with federal, state and local agencies with varying degrees of say over whether a trade may occur, and worked closely with private developers and state and federal agencies wanting to pursue trading as a water quality protection option for their land disturbing projects. We have also analyzed the mechanisms used by state (Virginia Department of Transportation), federal (Department of Defense, Federal Highway Administration) and private developers to meet Virginia's stormwater nutrient requirements. In this effort we have identified a large number of projects that could utilize nutrient credits with significant cost savings and environmental benefits over traditional forms of on-site nutrient controls. In general terms we have found that nutrient credits can represent a 30 to 40 percent cost savings over most forms of on-Site phosphorous controls. The savings to a developer can be invested in more development spurring additional economic activity. When nutrient credits are used for state or federal agency needs, significant tax payer dollars can be saved and permitting and project efficiencies can be gained, all while providing not just nutrient management but many other environmental (e.g. open space and habitat preservation) and social benefits (e.g. income to farmers). The private nonpoint nutrient market truly represents private investment with multiple public benefits.

Based on our seven years of effort we provide the following suggestions on key Congressional efforts that could be implemented to create a vibrant private nutrient trading market.

1. Provide a clear endorsement of nutrient credit trading mechanisms meeting reasonable standards including that the nutrient credits represent actually implemented nutrient reductions prior to sale or application to a permit. Multiple layers of decision making on use should be avoided – a single state level policy that is consistently applied at all levels of government provides market stability and predictability for private sector investment in banks and for nutrient credit use by developers.

2. Do not create a federal bureaucracy but rather support consistent standards that promote the development and success of a private market. Central to this will be the private market establishing pricing and not having to compete against governmentally run or supported efforts which (i) do not

account for full costs of credit generation and maintenance and (ii) allows the "regulator" undue control over whose credits a permittee may buy.

3. Assure that a nutrient credit purchased today, meeting today's standards including that they be protected in perpetuity, can be applied to projects that may span multiple stormwater permit cycles or to future projects.

4. Require that federal agencies acquire nutrient credits generated by private entrepreneurs to the fullest extent practicable instead of using on-site nutrient treatment mechanisms (this would be consistent with the TEA-21 and the Corps/EPA wetland and stream "Mitigation Rule"). Where necessary provide the appropriate authority to agencies that assert they do not have authority to acquire nutrient credits as has been our experience with the Department of Defense.

5. Provide funding for federal or state agency acquisition of pools of nutrient credits from private banks, either through direct appropriations or revolving funds, for current and future agency stormwater compliance needs. Funding priority should be to those states that have taken the lead in developing nonpoint nutrient trading programs. This would show federal endorsement and commitment to trading which in turn will spur additional private investment in nutrient banks. One of the most innovative and promising uses of nutrient trading is for incorporation into ongoing and future transportation infrastructure improvements being implemented by FHWA, USDOT and VDOT.

CBNLT has significant data and experience in the development of a nonpoint nutrient trading market to support the above suggestions which we would be happy to share with you and the Subcommittee. We are hopeful that you will have additional hearings on nutrient trading. If you do have such hearings, we would be very eager to provide testimony as I am sure would other private entrepreneurs.

Thank you for considering these comments. Please do not hesitate to call upon me, my business partner Scott Reed (804-222-5114), or our outside legal counsel Shannon Varner with Troutman Sanders LLP (804-697-1331), with questions or for assistance.

Sincerely,

Brent L. Fults

Brent L. Fults
Managing Member
Chesapeake Bay Nutrient Land Trust, LLC

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The Chesapeake Bay Nutrient Land Trust, LLC (CBNLT) was founded in August of 2006 as a response to the public, governmental and our own personal interest in improving the water quality of the Chesapeake Bay. We provide land stewardship strategies that will reduce nutrient loads and generate nonpoint nutrient credits (Credits). These Credits are similar in concept to other types of environmental credits and represent on-the-ground nutrient reductions that are in place in advance of the need for their use. CBNLT believes in innovative and adaptive nutrient reduction strategies that are pre-implemented in order to begin improving the health of the Bay immediately. We strive to encourage environmental stewardship and the development of partnerships with landowners, federal, state and local governments and other stakeholders in order to create long-term and effective solutions to complex environmental issues.

Chesapeake Bay Nutrient Land Trust, LLC. • 5735 S. Laburnum Avenue • Richmond, VA 23231 • P: 804.222.5114 • www.cbnlt.com