CHESAPEAKE ENVIRONMENTAL PROTECTION ASSOCIATION, INC.
P.O. Box 117, Galesville, Maryland 20765

NEWSLETTER

Winter 2008-2009

PRESIDENT'S MESSAGE

By Al Tucker, President, 2009

It is always good to anticipate what the next year may yield. In the world of environmental activism the pace can seem almost glacial (slow by human standards, but high speed with respect to geologic time). In fact, it is hard to believe that 12,000 years ago the bay was a canyon, 200 feet deep. It was the melting of glaciers that raised the sea levels by that amount. Our present collective memories are often shaped not by the distant past but by snippets of oral history passed on to us by our parents and grandparents. Thus, when we see the bay today, we still remember the stories of shoveling crabs or oysters, catching huge rockfish, seeing streams overrun with shad and menhaden, or standing in water so clear you could see your toes in chest-deep water. Our forefathers could not conceive that this resource had any limitations whatsoever. It was a protein factory there for the taking. Previous generations had little understanding of the interconnectedness of life in the Bay's watershed. Agriculture, which transformed humankind at about the time the glaciers melted, brought forth modern civilization and thus allowed humans to exploit all the planet's resources.

Today, in many ways, we continue to live much as we did at the dawn of civilization. Our economic models still reflect the notion that food, water, and energy are infinite. We still think that we need only to consider the costs of processing, transporting and consuming. Direct post-consumption costs are hidden from us in landfills and recycling (it doesn't pay for itself) since we pay for them in property taxes. And these trivially small payments fail to cover the true economic cost of damage to the environment and ultimately our well-being as humans. The fact is that harvesting fish, extracting nutrients for growing food, using coal, oil, and natural gas for energy, etc. represent capital that is spent, and alternatives will have to be found to replace them. We are not facing reality and just passing the issue to future generations. It's the equivalent of a giant environmental Ponzi scheme and is not sustainable. Nearly all energy on earth comes from the sun and now humans are consuming resources faster than the sun can replace them. In fact, in some ways, such as greenhouse gases, our consumption is actually hindering the sun from doing its job. It is time for all of us to work toward the development of sustainable use of critical resources. It is time to change our economic models to reflect the costs of creating sustainable ecosystems that supply good, healthy, and secure lives for all.

The ecosystem of the Bay represents a microcosm of the planet, so what happens to the Bay is indicative of what is happening to the global environment. The magnitude of degradation of the Bay is so staggering that no one single organization can address all the issues necessary to return the Bay to a sustainable ecosystem. It will require the efforts of all. Large interstate organizations such as CBF, Alliance for the Bay, and the Riverkeepers Alliance will need to work with policy coordination. Smaller organizations, though, must handle the regional and local issues specific to their geographic areas and environmental missions.

CEPA is small regional organization whose mission is to lead efforts to restore the health of the Chesapeake Bay through a combination of public information, governmental influence, and direct personal involvement. It is an advocate for the Bay, its tributaries, and the groundwater resources of the Bay watershed.

For many years, CEPA has been concerned about groundwater resources in the state, and we feel that this vital issue needs more attention. We expect to be focusing more of our energies on this issue in the future. Groundwater is a precious resource and does not have many advocates in Maryland. In the upcoming year, we intend to analyze all the issues surrounding availability, quality, usage, recharge and projected reserves in the southern Maryland aquifers. Groundwater, like many resources, is not easily replaced. Groundwater could be a sustainable resource, but current patterns of use are beginning to show stress on the reserves. Lack of groundwater has curtailed development in some localities, while other areas are stressed in times of drought. We hope that you will join us in our quest to increase the awareness of the critical issues surrounding groundwater.

IN THIS ISSUE:

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FORUM ON STREAM RESTORATION

FRIDAY, FEBRUARY 27 FROM 7 TO 9 PM
IN THE AUDITORIUM AT
SOUTHERN HIGH SCHOOL IN HARWOOD

SPEAKERS:
Dr. Margaret Palmer, Director, U of MD Chesapeake Biological Labs
Ron Bowen, Anne Arundel County Director of Public Works
Erik Michelsen, Executive Director, South River Federation

Urban Sprawl and the spread of development across Maryland has resulted in a tragic loss of natural habitat and a degradation of our streams. Water which used to seep into the ground now rushes into our streams carrying nutrients and pollutants with it into the Bay as it erodes the remaining natural stream beds. Natural barriers to Bay pollution are disappearing at an alarming rate.
The CEPA Forum will define the scope of this growing problem while presenting opportunities for the public to become involved in the processes of zoning changes and challenges, subdivision approval and the granting of variances and permits. There have been successful neighborhood stream restoration solutions which will be highlighted.
If you have any questions or want more information about the CEPA Forum on Stream Restoration, call: (410)257-6947 or send e-mail to: racebeat@aol.com

CHESAPEAKE ENVIRONMENTAL PROTECTION ASSOCIATION
is presenting this forum free of charge as a public service

FORUM SCHEDULED ON STREAM RESTORATION

By Rich Romer

Annually, CEPA presents a Mid-Winter public forum on a subject of significance to the local environmental community. Two years ago, the Forum dealt with the proliferation and adverse impact on the Bay of impervious surfaces. In 2008, CEPA assembled a panel of nationally recognized experts to address the issue of ground water—both the issue of quantity as a result of increased demand and that of quality as a result of development and urban sprawl.

This year, CEPA has chosen Stream Restoration as the subject for its Forum which will be held in the auditorium at Anne Arundel County's Southern High School in Harwood. Scheduled for Friday evening, February 27 from 7 to 9 PM, the Forum will be chaired by Dr. Margaret Palmer, Director of the University of Maryland's Chesapeake Biological Laboratory in Solomons. Not only is Dr. Palmer an internationally recognized expert on the subject, but as a resident of Davidsonville, she has a personal interest in restoring local streams. She has published a number of recent high profile articles on the issue.

Anne Arundel County Public Works Director Ron Bowen has accepted CEPA's invitation to join the panel. He will speak to the needs and projected costs for restoration, where the concerns are the greatest, and the challenges of dealing with both our ecological needs and political pressures. He will talk about how runoff issues are dealt with in established neighborhoods as well as new developments, and also what can be done to retrofit streets, parking lots and highways.

South River Federation Executive Director Erik Michelsen is the third member of the panel. He will discuss the current status of the Federation's efforts to restore streams in the watershed. Using graphics and photography, Michelsen will demonstrate the measures, many of them inexpensive and easily implemented, which result in a dramatic reduction of the pollutants and nutrients which reach the Bay through our network of local streams.

CEPA Trustee Rich Romer is organizing the Forum, as he has done the two previous years, and he will serve as its moderator. Each of the three presentations will be followed by a Question and Answer session and then a panel discussion, the focus of which will be the South River watershed. The challenges of stream restoration in Anne Arundel County will only grow in the near term as development proliferates around Fort Meade as the U.S. military's Base Realignment and Closure process adds as many as 18,000 people to the local workforce.

CEPA is presenting the Stream Restoration Forum free as part of its public service and outreach mission. For additional information about the Forum, please call: (410)257-6947 or send e-mail to: racebeat@aol.com. For further information about the CEPA, go to: www.cepaonline.org.

VOLUNTARY VERSUS MANDATORY

West/Rhode Riverkeeeper's Report
By Chris Trumbauer

To mark the 25th anniversary of the establishment of the Chesapeake Bay Program, a coalition of respected scientists and former elected officials signed a 16-page statement with blunt recommendations and calls for action. Significantly, they called for a "transition from the voluntary collaborative approach in place for 25 years to a more comprehensive regulatory program that would establish mandatory, enforceable measures for meeting the nutrient, sediment and toxic chemical reductions needed to remove all bay waters from the Clean Water Act impaired waters list."

The bottom line is that the status quo is not working. Any of us can look at the bacteria levels at our favorite swimming beach, the price of a bushel of crabs, or the murkiness of the river in the middle of summer and know we need to do something different.

The catalyst that is missing right now is political will. We know that nutrient pollution, in the form of urban and agriculture runoff, is a major contributor to the poor water quality of the Bay and its rivers. But our politicians and decision makers have failed us. They haven't mandated the changes needed to show improvement. Make no mistake, the investments and sacrifices needed to actually make a difference will not be easy to implement. That's why we need leadership right now.

People can change, but it takes an event or a spark to ignite that change. Nobody was a fan of $4.00 gasoline, but that situation caused more people to start carpooling and riding mass transit than any advocacy campaign. We need our elected officials to make the hard choices and enact legislation that will make a difference. We need to control the nitrogen from our septic systems, reduce manure and fertilizer runoff from agriculture, require better stormwater management, and protect our wetlands and forests from development. None of this will be easy, but it is necessary if we want to enjoy clean and safe rivers.

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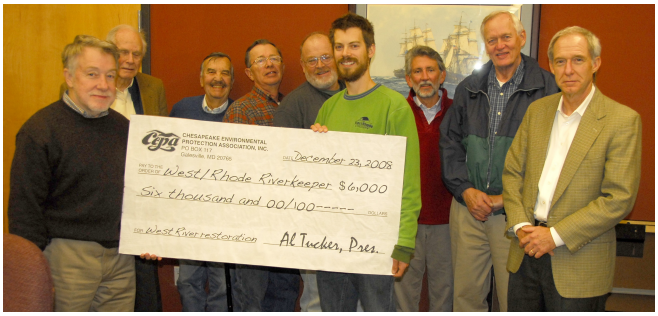
CEPA AWARDS GRANT TO WEST/RHODE RIVERKEEPER



West/Rhode Riverkeeper Chris Trumbauer is shown with CEPA Trustees at their Dec. 23 meeting. From left are President Al Tucker, Steuart Pittman, Lee Greenbaum, Lloyd Lewis, Mike Lofton, Trumbauer, Bob Gallagher, Gary Antonides, and Jerry Hill.

On December 23, the Board of Trustees of CEPA presented a check for $6,000 to the West/Rhode Riverkeeper Chris Trumbauer. Earlier in the year, the Riverkeeper received a grant from the Chesapeake Bay Trust to do restoration work in the West River Watershed. CEPA's contribution will be used to support that work, which will implement several restoration projects. These include a comprehensive watershed assessment and two stormwater retention areas intended to treat runoff.

"We are proud to have CEPA as a partner in this effort. This generous grant will help us do real work to reduce pollution going into the West River," said West/Rhode Riverkeeper Chris Trumbauer.

The funds for the grant came to CEPA after the dissolution of the West River Federation, a group formed in the 1980s to oppose inappropriate development around the West River.

CEPA President Al Tucker said "CEPA has supported the work of the West/Rhode Riverkeeper from its beginnings and is pleased to be able to make this contribution. This grant will advance the purposes of CEPA and is consistent with the mission of the West River Federation."

IMPACTS OF BIOFUELS ON WATER RESOURCES

By Gary Antonides

In the last two issues of the CEPA Newsletter, we discussed some pros and cons of ethanol and biodiesel fuels. Some indication was given as to the energy gained vs energy expended in production, and the amount of land used for various feedstocks. But there are more impacts to be considered, two of which are the amount of water used in producing the biofuels and how much water pollution results. These are addressed in a comprehensive National Research Council Report "WATER IMPLICATIONS OF BIOFUELS PRODUCTION IN THE UNITED STATES," Oct. 10, 2007, (http://books.nap.edu/openbook.php?record_id=12039&page=R1). The report was written by a committee with members from several universities and chaired by Jerald Schnoor from the University of Iowa. The report is based on a colloquium given on July 12, 2007. The following information is taken from that report, which indicates that, for biofuel production, the direction we are heading is unsustainable.

Present Situation. At present, the primary biofuel in this country is ethanol derived from corn kernels. At a much lower level, the primary biodiesel source is soybeans. The government has provided subsidies for the production of ethanol since the 1970's ranging from 40 to 60 cents per gallon. Also, President Bush has set a goal of 35 billion gallons of ethanol annually by 2017, as compared to a present production of about 7 billion gallons . That would provide about 15% of the transportation fuels in the U.S. With current policies, further expansion of the corn ethanol industry is almost guaranteed. There are a few concerns starting to emerge from this trend. We have already read about the food versus fuel controversy resulting in higher prices for corn. With the subsidies, the economic advantages of growing corn for ethanol production are more attractive than other crops. This is resulting in land now being used for other crops, soybeans being the most common example, being converted to growing corn. This will result in upward pressure on the prices of other foods as well as corn. In addition, land, not now being used for any form of agriculture will be used for growing corn.

Unfortunately, growing corn uses more water, fertilizer, and insecticides than most crops, raising concerns about depleting our available supplies of water, and about polluting our waters. In addition, any new land being farmed will result in more sediment in our streams, rivers, and coastal waters.

Fertilizer can result in excess nutrients in the form of nitrogen and phosphorous flowing into waterways via surface runoff and infiltration into groundwater that finds it's way into our wells. Excess nitrogen going into the Mississippi River system is a major cause of the oxygen-starved "dead zone" in the Gulf of Mexico, in which many forms of marine life cannot survive. This dead zone covers more than 4,000 square miles. This condition is called "hypoxia" and is also found in other inland and coastal waters, including the Chesapeake Bay whose dead zone has tripled in the last 40 years, and, in some summers, amounts to a quarter of the main stem of the Bay.

Of particular concern is the conversion of soybean crops, used for biodiesel, to corn for ethanol. In the following table, typical application rates are scaled relative to the amount of energy gained with each biofuel (energy gain is the ratio of the energy that comes from the biofuel to the energy used in production). The table also illustrates the importance of choosing appropriate metrics when evaluating the various options. The metric chosen here (energy gain) for corn ethanol is about 1.3, for soybean biodiesel it is about 2.0. Other metrics used could be related to the amount of land required to produce biofuel, or the amount of water used.

TYPICAL APPLICATION RATES FOR CORN ETHANOL AND SOYBEAN BIODIESEL PER ENERGY GAIN
SOURCE: Hill et al. (2006).

	Nitrogen	Phosphorous	Pesticides
Corn Ethanol	7.0	2.6	0.10
Soybean Biodiesel	0.1	0.2	0.01

Unsurprisingly, studies have shown that the amounts of nitrogen, phosphorous, pesticides and insecticides found in our water supplies are directly related to how much is applied in the region for agriculture.

Growing more energy crops will affect the availability of water for all purposes. In some areas of the U.S., water resources are already stressed. The water level in large portions of the Ogallala aquifer, which extends from west Texas up into South Dakota and Wyoming have declined over 100 feet. West of Chicago, there is an aquifer that has been drawn down more than 800 feet since 1850.

Some of the water used in growing crops comes from rainfall, but the rest must come from groundwater or surface water sources. Some of the water can be reused, but irrigation accounts for the majority of the nation's "consumptive" use of water, which is that lost through evaporation and through plant leaves that does not become available for other uses. Almost all of our stored water resources are now contained in aquifers, and using that water much faster than it gets recharged essentially means that that water is a non-renewable resource.

The production of all liquid fuels involves the use of water. The consumptive water use for corn ethanol plants is about 4 gallons per gallon of ethanol, and for biodiesel it is about 1 gallon per gallon of fuel. For comparison, consumptive water use in petroleum refining is about 1.5 gal/gal. But the water used for growing the crops is many times more. It depends on the local growing conditions, but in Nebraska, it was estimated that growing corn uses about 200 times as much water as that used in the ethanol biorefinery. The fact that biorefineries concentrate the need for water in a small area often causes problems with local water resources.

Cellulosic Ethanol. For many reasons, the picture looks much brighter when the use of cellulosic ethanol is considered. This is produced from cellulosic materials such as grasses, crop residues, and woody crops. While corn based ethanol can be made by converting starches in corn kernels into sugars and fermenting the sugars, the larger molecules in cellulosic materials must first be broken down into sugars. This is done with enzymes, and there are pilot and demonstration facilities that produce cellulosic ethanol, but much research needs to be done to improve current techniques to the point where they can be used for large scale production. That is thought to be 5 or more years away, and until that happens, we can only speculate how cellulosic ethanol will affect the industry. However, what is known is promising. It is expected that the energy gain ratio for cellulosic ethanol with be considerably greater than corn ethanol, for example switchgrass ethanol should have an energy gain ratio of 4 to 15. Cellulosic feedstocks generally require less water and chemicals than corn to grow and cause less soil erosion. Exactly how much water and chemicals will be required is hard to say because it depends a lot on what crop characteristics can be bred into whatever crops are selected as well as the local growing conditions. Crops have long been genetically engineered to produce better food crops, and presently biotechnology is doing research to produce better fuel crops as opposed to food

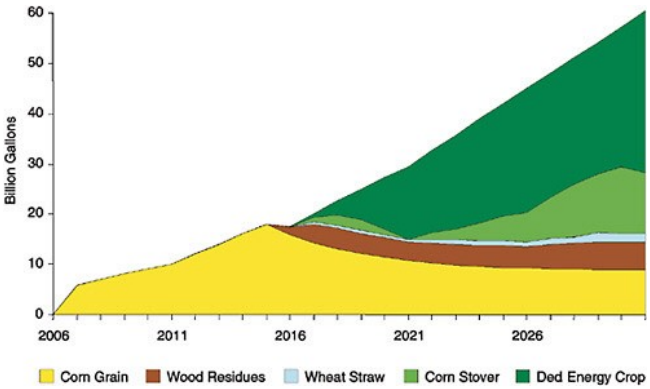
crops. Irrigation of native grasses is unusual, but if they are used as feedstocks and grown on marginal lands, they will most likely require some irrigation and fertilizer. However, with native grasses at least, the use of both fertilizers and pesticides is expected to be an order of magnitude less than either corn or soy. It is possible that wastewater that is biologically or chemically unsuited for irrigation of food crops could be used for energy crops.

As far as cellulosic feedstocks, the most seems to be known about switchgrass and other grasses. Consumptive use of water in processing cellulosic ethanol is estimated to be as much as 10 gallons per gallon of fuel, but that is expected to decrease to about what corn ethanol uses as techniques improve.

Cropland erosion causes about half of the sediment that makes its way into our waterways each year, and the sediment carries nutrients and pesticides with it. Sediment by itself has a profound effect on fish and other aquatic wildlife. It is filling up our streams, rivers, and the reservoirs behind our dams, and sedimentation requires more dredging for both transportation and recreation.

In 2005, a study by the Departments of Energy and Agriculture concluded that the U.S. could produce 60 billion gallons of ethanol by 2030 from a combination of cellulosic and grain feedstocks. That would be enough to replace 30% of projected U.S. gasoline demand.

Even with the addition of cellulosic crops, corn will likely comprise a significant portion of biofuel crops. The figure below illustrates a projection of crop production based on ethanol from cellulose becoming commercially available by 2015. The assumptions are that agricultural commodity programs remain as of 2006, that the current cropland base stays within the 434 million acres now used, and that yield increases in food and feed crops is sufficient to meet domestic demand, but that there is a decline in U.S. exports of such crops. "Dedicated energy crops" are those grown solely for energy production.



Source: D. Ugarte, Univ. of Tennessee, July 12, 2007

Even with the switch to producing cellulosic ethanol, it will still be necessary to use all the conservation techniques developed for agriculture in general to minimize the impacts on our water resources. These techniques include applying water to crops at the surface or even below the surface instead of using the familiar large circular water sprinklers that used to be seen in the fields. That can save the 30% or so of water that would otherwise evaporate. Terracing, keeping animals away from streams, and using tree buffers by streams, are all important. In the case of corn, the stover (stalks and cobs) are often left on the field to retard erosion. Some experts advocate that the stover be used as cellulosic feedstock, but then some other way should be found to cover the ground. It has been found that when most of the stover is removed, it results in about 10 times the erosion as when it is left. "Precision Agriculture" techniques can be used to tailor irrigation, fertilizers, and pesticides to local conditions, and involves the use of various types of sensors to monitor soil and weather conditions.

The NRC report gives the impression that we know enough about how we should proceed with biofuel development, particularly the development of cellulosic ethanol, but the political realities surrounding that industry will be a challenge for those who will try to institute changes in government policies and incentives to encourage the proper courses of action. Those policies and incentives should be related to the impacts on water resources and other environmental impacts as well as the amount of biofuel produced.

PROFILE OF A TRUSTEE

Dr. Dennis Whigham, Ph.D.

Dennis Whigham was born and raised in Pennsylvania. Having an interest in biology, he got his B.A. from Wabash College in Indiana in 1966, and his Ph.D. from the University of North Carolina in 1971, where he also did post-doctorate work. He joined the faculty of the Biology Department at Rider University in New Jersey. Then, in 1977, he joined the staff at the Smithsonian Environmental Research Center (SERC) and has been employed there ever since. However, during that time, he took sabbaticals at the University of Utrecht (Netherlands) and Harvard University. His association at Utrecht led to an appointment as Professor of Landscape Ecology.

He has been active in several national and international professional organizations, including the Ecological Society of America and the American Institute of Biological Sciences, both of which he has served in elected and appointed positions. He has served on the editorial boards of several journals and currently serves on the Board of Directors of two non-profit environmental organizations in addition to CEPA.

At SERC, he has done research on a wide range of plant related topics such as how plants interact with their environment and how that interaction affects ecological processes. He has authored or co-authored approximately 150 papers on topics ranging from pollination ecology to nutrient cycling in wetland ecosystems. Among his current interests are interactions between plants and mycorrhizal fungi, invasive species, wetlands, and the ecology of woodland herbs. He is currently Deputy Director of SERC.

He has been a valuable member of CEPA for 10 years. A few years ago, he described his studies about the effects of varying amounts of impervious surfaces on the water quality in streams, rivers, and the Bay at a CEPA Forum.

His hobbies involve all sorts of outdoor activities including biking, bird watching, and hiking. He and his wife Jan live in Crofton where he is active in community activities. They have two grown children who live close to nature in Alaska and Vermont. Two granddaughters in Alaska also are a major focus of their planning and travel activities.

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CEPA distributes its newsletter primarily by electronic means, but if you prefer to get it by mail, just let us know. Either way, contact Gary Antonides (garyanto@verizon.net). Newsletters are posted on www.cepaonline.org in pdf files. When a new newsletter is available, we send emails with a direct link to it.

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A CEPA membership entitles you to receive our newsletter and to vote for our Trustees.

We also provide you the opportunity to support the West/Rhode River Riverkeeper. Those donations go directly to that organization.

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