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

NEWSLETTER

Fall 2008

PRESIDENT'S MESSAGE

By Al Tucker, President, 2008

Recently two major state advisory boards completed their efforts and both issued reports that have significant findings that are important to our members. The first, Water for Maryland's Future: What We Must Do Today (also referred to as the Wolman Report) [ref. 1], represents one of CEPA's primary interests; this report, however, must be read in conjunction with the second, The Maryland Climate Change Commission's Climate Action Plan [ref. 2] in order to understand how our water resources might be affected.

Unfortunately, the Wolman report fails to convey the urgency for conserving the State's most important natural resource, WATER! But the Climate Action Plan sounds a clarion call for action – because climate change will happen. We will face not only a high degree of environmental variability, but, without preparation, will also experience economic instability across the state. This conclusion is based on observed data and predictions from various climatic models.

The Climate Action Plan forecasts that the availability of water will decrease across the state in spite of a small, predicted precipitation increase of about ten percent. This increase will occur mainly in winter, while hotter summers will increase evaporation. Hence, droughts lasting several weeks can be expected in summers. More precipitation in winter would replenish reservoirs, but drier summers with only episodic rain events would not alleviate the current overdrafts of groundwater. Summer rains are unlikely to be able replace the groundwater in overtaxed aquifers.

Drier summers across the state will compel agriculture to use more irrigation, further straining freshwater supplies. Increased population growth will create more impervious surfaces. Coupled with the increase in intense episodic rainstorms, rapid flows increase stream temperatures, significantly impairing the habitat of aquatic life, wildlife and forests. The stressed environment will transmit more sediment and nutrients into an already overstressed Bay and its estuaries. The Plan goes on to address other impacts of the changing global climate on Maryland's agricultural industry, forestry resources, fisheries resources, aquatic and terrestrial ecosystems, and human health.. It also addresses the cost of inaction, a cost that would be transferred to future generations.

The Wolman report acknowledges its own lack of information about the state's water resources. It is a plea to the state legislature for action to remedy this need. However, the report (see the appendices) contains incidents that should sound the alarm for the public. For example, wells have faltered in dry spells requiring communities to have water trucked to them; entire communities, such as Mt. Airy and Middletown, are under building limitations; saltwater has intruded into freshwater aquifers in Anne Arundel County; and the aquifer in Charles County will be depleted by 2030. These examples by themselves should be cause for alarm, yet it is as if no one is listening. The report outlines steps the state should take, but in an atmosphere of severe budget restrictions, the required steps are unlikely to be considered.

Taken together, the reports lead to one conclusion - severe water shortages will increase across the state. Climate change will accelerate these occurrences and increase the severity of their effects. Without knowledge of the limits on the state's water resources, the citizens of Maryland will incur severe economic and social costs. Citizens should take an interest and inform their state senators and representatives about the costs of inaction. CEPA is committed to keeping our decision makers informed about the risks of inaction.

References:

1. ***Water for Maryland's Future: What We Must Do Today***, VOL 1&2: FINAL REPORT [July 1, 2008]

http://www.mde.state.md.us/assets/document/WolmanReport_Vol1.pdf

http://www.mde.state.md.us/assets/document/WolmanReport_Vol2Appendices.pdf

2. ***The Maryland Climate Change Commission's Climate Action Plan***, [August 27, 2008]
http://www.mdclimatechange.us/index.cfm

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BOARD OF TRUSTEES

WEST/RHODE RIVERKEEPER'S REPORT

By Chris Trumbauer

Two Large Fish Kills Reported - Water quality monitoring conducted by West/Rhode Riverkeeper volunteers has indicated low dissolved oxygen levels for much of the summer. But the ultimate indicator has recently appeared – thousands of dead fish floating on the water's surface.

The first fish kill was reported on September 5 in South Creek in the West River. A waterfront homeowner came out onto his pier in the early morning and noticed that the crabs in his live box were trying to climb out of the water. Looking around, he then noticed numerous small fish floating dead on the water's surface. I alerted Maryland Department of the Environment (MDE), and they came down to collect some samples and document the event. The official estimate was 6,000 dead menhaden.

On September 23, I got a similar call – this time from Bear Neck Creek on the Rhode River. This fish kill was much larger, with dead menhaden covering the whole creek from Holly Hills to Rhode River Marina. MDE estimated that 40,000 fish were killed, but admitted this was a conservative estimate. In both cases, low levels of dissolved oxygen were blamed.

Menhaden travel in schools and are particularly susceptible to low oxygen conditions. Low oxygen levels are caused in part by algae blooms, fed by too many nutrients in the water. Excess nutrients come from a variety of sources, including agricultural and urban runoff, septic systems, and sewage treatment plants. Algae blooms produce oxygen during the day when the sun is shining, but use up oxygen at night when it is dark. That's why most fish kills happen late at night or just before daybreak.

Many factors contribute to poor water quality. West/Rhode Riverkeeper was recently awarded a large grant from the Chesapeake Bay Trust that should help us implement some solutions. We will be performing a watershed assessment of the West River to identify sources of pollution and locations for potential restoration or preservation. We'll also be designing and building two bio-retention areas to treat runoff, one in Galesville and one at Discovery Village in Shady Side. While these projects alone won't be enough to prevent future fish kills, hopefully they will inspire other projects, and their cumulative effects will be healthier rivers.

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PST LANDFILL

By Bob Gallagher

The PST Landfill is a rubble landfill located off Sands Road in Harwood. It operated under certain permits issued by the Maryland Department of the Environment (MDE), but now it has been closed for several years. Waste Management, Inc. (WMI), the last operator of the site, is obligated to monitor the site for possible contamination of ground water for a period of several years.

At the request of county and community leaders, CEPA applied to Anne Arundel County for a grant of funds to review WMI's monitoring reports and, in the event that monitoring by WMI is no longer required, to establish a continuing monitoring program. In late 2007, CEPA received a grant from the county in the approximate amount of $92,000. The grant funds came from a community benefit fund established during the operation of the landfill.

Upon receipt of the grant, CEPA appointed a Landfill Committee. In December 2007, members of the committee reviewed the files of MDE relating to the landfill, including monitoring reports provided by WMI and extensive correspondence between MDE, WMI and WMI consultants relating to the monitoring program. CEPA also engaged an environmental consultant, Andrew Garte & Associates of Shady Side, to review these materials.

The review by the committee and the consultant raised a number of questions and concerns about the adequacy of the current monitoring program and about monitoring reports that indicated the presence of certain metals and volatile organic compounds (VOCs) in test wells. As a first step in following up on those concerns, CEPA sought a meeting with MDE officials familiar with the monitoring program.

In August 2007, members of the committee submitted to MDE a list of their questions and concerns. Later in August, members of the committee and Andrew Garte met with several MDE officials at MDE's offices in Baltimore. The officials provided a thorough explanation of the monitoring program including recent changes. They discussed MDE's role in the monitoring program and the prospects for continued monitoring. They also addressed the concerns about the presence of certain metals and VOCs in test wells. In the opinion of MDE, the metals do not present a public health risk because they are at very low levels, consistent with "background levels." They expressed a similar view with respect to the VOCs. While they did not contend that the VOCs were at "background" levels, they believe that the VOCs do not present a health risk and that they likely resulted from operations near the site unrelated to the landfill.

The committee expects to request WMI to allow the committee and consultant to visit the site and address

additional questions to WMI. Following the visit, the committee will follow up on any remaining questions and work with the consultant to establish a regular process for the review of future periodic monitoring reports. CEPA will describe the results of the committee's review annually in a report to the county and the community and more frequently if circumstances warrant.

BIODIESEL

By Gary Antonides

The last issue of the CEPA Newsletter had an article on ethanol. This issue will deal with some of the factors to be considered with the use of biodiesel fuels. Both are "biofuels" and the difference between them as described in www.treehugger.com/files/2006/07/ethanol_vs_biod.php is:
"Ethanol is an alcohol product produced from corn, sorghum, potatoes, wheat, sugar cane, or even biomass such as cornstalks and vegetable waste. When combined with gasoline, it increases octane levels while also promoting more complete fuel burning that reduces tailpipe emissions such as carbon monoxide and hydrocarbons. **Biodiesel** is a domestic, renewable fuel for diesel engines derived from natural oils like soybean oil, vegetable oils or animal fats."

Biodiesel is made through a chemical process called transesterification whereby the glycerin is separated from the fat or vegetable oil. The process leaves behind two products: methyl esters (the chemical name for biodiesel) and glycerin (a valuable byproduct usually sold to be used in soaps and other products).

The use of biodiesel in a conventional diesel engine results in substantial reduction of unburned hydrocarbons, carbon monoxide, and particulate matter compared to emissions from diesel fuel. In addition, the exhaust emissions of sulfur oxides and sulfates (major components of acid rain) from biodiesel are essentially eliminated. Depending on the process used for producing it (discussed later) biodiesel fuel could provide a great environmental benefit to trucking fleets, which consist almost entirely of vehicles with diesel engines.
According to http://en.wikipedia.org/wiki/biodiesel, biodiesel can be used alone or blended with conventional petrodiesel in unmodified diesel-engine vehicles. Biodiesel is distinguished from the *straight vegetable oil*, or pure plant oil used (alone or blended) in some *converted* diesel vehicles.

The "B" factor indicates the amount of biodiesel in any fuel mix. Fuel containing 20% biodiesel is labeled **B20**, while pure biodiesel is referred to as **B100**. It is common to see **B99**, since 1% petrodiesel is sufficiently toxic to retard mold. B100 may require certain engine modifications. Biodiesel degrades natural rubber gaskets and hoses in some vehicles (mostly vehicles manufactured before 1992), so they should be replaced with newer ones that are nonreactive to biodiesel. Also, biodiesel has been known to break down deposits of residue in the fuel lines where petrodiesel has been used. Therefore, it is recommended to change the fuel filters shortly after first switching to a biodiesel blend.

Distribution. Since the passage of the Energy Policy Act of 2005, biodiesel use has been increasing in the United States. Biodiesel is often more expensive to purchase than petroleum diesel but this is expected to diminish due to economies of scale and agricultural subsidies along with the rising cost of petroleum. In September 2005, Minnesota

became the first U.S. state to mandate that all diesel fuel sold in the state contain part biodiesel, requiring at least 2%. Biodiesel can also be used as a heating fuel in domestic and commercial boilers. Older furnaces may contain rubber parts that would be affected by biodiesel's solvent properties, but can otherwise burn it without any conversion required.

Properties. The energy of biodiesel is about 9% lower than regular petrodiesel. It has been claimed that biodiesel gives better lubricity and more complete combustion, thus partially compensating for it's lower energy density. Biodiesel varies in color between golden and dark brown, is lighter than and does not mix with water. It has a high flash point (266 °F) compared to petroleum diesel (147 °F) or gasoline (-52 °F). It has virtually no sulfur content. The temperature at which biodiesel starts to gel varies significantly and depends upon the feedstock oil used to produce it. For example, biodiesel produced from some varieties of canola seed starts to gel at approximately 14 °F, while that produced from tallow tends to gel at around 61 °F. Some vehicles have a second fuel tank for biodiesel which is insulated and heated. When the fuel is warm enough to burn, the driver switches from the petrodiesel tank to the biodiesel tank. This is similar to the method used for straight vegetable oil.
Availability and prices. In the US, average retail prices of B2/B5 are lower than petrodiesel by about 12 cents/gal., and B20 blends are about the same as petrodiesel. B99 and B100 generally cost more than petrodiesel except where local governments provide a subsidy. Biodiesel production capacity is growing rapidly, with an average annual growth rate from 2002-2007 of over 40%. For the year 2007, total world biodiesel production was about 10 million tons. This compares with a total demand for diesel in the US and Europe of approximately 490 million tons. Total world production of vegetable oil for all purposes in 2005/06 was about 110 million tons.

Biodiesel feedstocks. A variety of oils can be used to produce biodiesel. These include virgin oil feedstock (various crops), waste vegetable oil, animal fats, and algae. Algae can be grown using waste materials such as sewage without displacing land currently used for food production.

Some experts maintain that waste vegetable oil is the best source of oil to produce biodiesel, but the available supply is drastically less than the amount of petroleum-based fuel used in the world. Animal fats are similarly limited in supply, and it would not be efficient to raise animals (or catch fish)

simply for their fat. However, producing biodiesel with animal fat that would have otherwise been discarded could replace a small percentage of petroleum diesel usage. Currently, a plant is being built in the US with the intent of producing 3 million gallons of biodiesel from some of the estimated 2.3 billion pounds of chicken fat produced annually by a Tyson poultry plant. Similarly, some small-scale biodiesel factories use waste fish oil.

The transportation diesel fuel and home heating oil used in the US is about 160 million tons. Soybeans (shown in photo) are the primary source of biodiesel in the US. If the entire arable land area of the US (over 700,000 square miles) were devoted to biodiesel production from soy, this would just about provide the 160 million tons required (assuming an optimistic 98 gal/acre of biodiesel). Some typical yields of biodiesel from plants are given in **http://oilgae.com/algae/oil/yield/yield.html**:

Crop	Oil in Gallons/acre	
Palm	636	
Coconut	288	
Castor	151	
Sunflower	91	
Safflower	83	
Soy	48	(80-90% of US biodiesel is from soy)

(These numbers compare to ethanol yields of 1,100 gal/acre for switchgrass and 354 gal/acre for corn based ethanol.)

Algae for Biodiesel. The land area used could in principle be reduced significantly by using algae. Published numbers for algal yield vary wildly and much reaearch has yet to be done, but it is expected to be about 30 or more times that of soybeans. Like plants, algae require primarily three components to grow: sunlight, carbon-dioxide and water.

Algae can be cultivated in open ponds and lakes, but these systems are vulnerable to being contaminated by unwanted algal species and bacteria. And in open systems there is less control over water temperature, carbon-dioxide concentration and lighting conditions, so the growing season is largely dependent on location. The main benefit of this type of system is its low cost.

A variation on the basic "open-pond" system is to cover it with a greenhouse. That allows more different species to be grown and it extends the growing season. It is also possible to increase the amount of carbon-dioxide in these quasi-closed systems, which increases the rate of growth of algae.

Alternatively, algae could be grown in closed structures called photobioreactors, where the environment is more controlled than in ponds. The costs of setting up and operating a photobioreactor are higher, but the efficiency and higher oil yields could be significantly higher as well. Everything that the algae need to grow, (carbon dioxide, water and light) needs to be introduced into the system. Photobioreactors can be glass or plastic tubes, tanks, or bags.

Biodiesel produced from algae appears to be the only possibility for replacing petro-diesel *completely*. No other feedstock has an oil yield high enough to produce such large volumes of oil. It has been estimated that about 10 million acres of land would need to be used in the US in order to produce algae based biodiesel to replace all the petrodiesel used currently in this country. This is just 1% of the total land used today for farming and grazing. However, biodiesel has not yet been produced on a wide scale from algae. Large scale algae cultivation and biodiesel production appear likely in 4 to 5 years.
Some companies are presently buillding algae bio-reactors to study scaling up biodiesel production to commercial levels.

Since the use of a food crop for fuel can set up competition between food and fuel, some propose that fuel only be made from non-edible vegetable oils or algal oil. However, farmers could still switch large amounts of land from producing food crops to producing biofuel crops to make more money. Two advantages of algae biodiesel are that it would not use a significant amount of land currently used for food production, and it would create new jobs in algaculture.
We have discussed some of the land use issues involved in biofuel production, but there are many other considerations in the production of both ethanol and biodiesel. There is still a lot of ambiguity about the costs, both financial and environmental, because many of the technologies are still being developed. These costs include the necessary power, water, fertilizer, transportation, etc. The next CEPA newsletter will explore some of these issues.

PROFILE OF A TRUSTEE

RICHARD A. ROMER

Having grown up by the side of San Francisco Bay in Burlingame, California, it is only natural that Rich Romer would settle where he could see water. For the past 16 years, he has lived in the northern Calvert County municipality of North Beach immediately south of the Anne Arundel County line and is a committed advocate for the Chesapeake Bay.

After graduating from Stanford University, Rich

entered the U.S. Air Force for a 25 year career retiring in 1987 as a Colonel. During that period, he served four overseas assignments in the Pacific, including a combat tour in Vietnam, and acquired a Master's Degree in Logistics Management. After his Air Force retirement, Rich spent another 10 years as a Defense consultant which included a two year contract to work in China.

Since fully retiring in 1995, Rich has remained active, reinventing himself in a variety of areas. He is the Contributing Editor of a weekly paper, *The VOICE of Southern Maryland,* which covers Calvert and Southern Anne Arundel Counties, where he reports on county and municipal government, local politics, human interest, and general news. He appears regularly on the Cambridge, MD radio station WCEM (1240AM) during their daily afternoon show, *New School*. He frequently jokes that, "...I may have to go back to work just to generate some free time."

In 2006, Rich and one of his neighbors formed the North Beach Publishing Company, LLP. They have written and published the World War II memoirs of two local veterans--*Radioman for the Artillery*, which recounts Larry Hatch's 33 months of combat in Italy and *Three Brothers of the Greatest Generation,* Ed Finch's story of his experiences and those of his two older brothers in the U.S. Navy aboard destroyers in both the Atlantic and the Pacific. The books go on to describe who these veterans became after, and because of, the War. More WWII memoirs are in the works.

An active boater all his life, Rich served as Commander of the 300 member Annapolis Sail and Power Squadron, the local unit of the United States Power Squadrons. He was responsible for bringing their Department of Natural Resources certified Boater Safety education to southern Anne Arundel and northern Calvert Counties. He currently owns and operates a 30 foot Wellcraft Express Cruiser which is berthed in Chesapeake Beach. He has been an active oyster farmer and helped bring attention to Dominion Energy's creation of an artificial oyster reef in the Gooses area of the Bay west of the Little Choptank River.

Rich is in his third year as a member of the CEPA Board of Trustees. He serves as a member of the Planning Committee and, most recently, chaired the Committee which developed an updated set of By-Laws for the organization. He noted, "The process of developing the new By-Laws was fascinating because each Trustee focused not only on the long term future of CEPA, but on how we can most effectively bring our expertise and influence to bear in improving the health of the Chesapeake Bay."

Rich has organized and chaired CEPA's two most recent public forums--the first dealt with the adverse impact of proliferating impervious surface on the health of the Bay, and the second focused on the issue of ground water quantity and quality as residential and commercial development overwhelm this area. A CEPA forum is already being planned for early 2009 which will bring needed attention to another matter of critical interest to the environment.

Asked about his commitment to improving the health of the Bay, Rich said, "CEPA is a unique organization. The Trustees bring a synergistic blend of expertise which allows the organization to focus quickly on critical issues. The admirable role we have taken in monitoring Waste Management's PST landfill in Harwood insures that any pollution of the ground water will be immediately detected and remedied. We are becoming increasingly active in identifying good ideas and best practices and encouraging their adoption to protect the waters of the Bay and the tributaries which feed it. When CEPA speaks to government agencies, those in charge are compelled to listen and, frequently, to act. CEPA has a credibility to which other environmental organizations can only aspire."

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