



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

NEWSLETTER

Spring 2020

PRESIDENT’S MESSAGE

By Al Tucker



At this time, the coronavirus is surging throughout the world. First, I hope you are keeping yourself safe and observing all the protocols of social isolation, washing your hands frequently, and helping others if you can.

By its eponymous name, the coronavirus - covid19 is not a living thing, it requires a living cell to replicate itself. In this case, humans provide the ideal environment for it to replicate and transmit itself. If you have the infection, the best way to stop the replication and transmission is to break the chain of transmission. If not, you can break the transmission by isolating yourself and taking all the recommended precautions. But whether or not you become sick, you are making a contribution to society by halting the spread of the virus when you self-isolate. If you become sick and your symptoms are bearable, your recovery will boost the “herd immunity” of the population. It is estimated, that if 40% of the population develops herd immunity, it will rapidly slow the infection and reinfection rates, it will ease the burden on the health care system, and it will point to the development of a vaccine. However, until a vaccine is developed, we need to be prepared for a different future of human interaction.

Therefore, please continue to make your own personal contribution toward stopping this pandemic through self-isolation. We can all thank each other when the coronavirus pandemic subsides.

PUBLIC ACCESS AND THE FUTURE OF BAY RESTORATION

By Mike Lofton



The mission of the Chesapeake Environmental Protection Association (CEPA) is plainly stated in our name. We aspire to be a leader in the work to restore the health of the Chesapeake Bay through a combination of public information; governmental influence; direct personal involvement; and advocacy for the Bay, its tributaries, and the source water resources of the Bay watershed.

In pursuit of this mission, CEPA produces an Annual Plan to guide the work of the Board of Trustees. In 2020 the Board has added a focus on limited public access to the Bay as an issue of concern. In choosing to add public access concerns to the Plan, the Board has acknowledged the issue as one of significance and worthy of CEPA’s scarce resources.

What is the Problem?

A Presidential Executive Order in 2009 established the Chesapeake Bay program. Among its principle tasks was the creation of 300 new Bay access points by 2025. A modest goal at best and not one that is likely to produce safe convenient Bay access for millions of people that live in the watershed. According to the National Park Service, “The number of access sites is very low in comparison to the amount of shoreline in the Chesapeake watershed. There are just 770 existing access sites along the shorelines of the Bay and tidal portions of its tributaries, a combined length of 11,684 miles.” Estimates put the portion of Bay shoreline available for public use at about 2%.

Water access is central to the rich quality of life we enjoy in Anne Arundel County. But for generations, the public has been losing the ability to enjoy the waters of the Bay and its tributaries. By 2010, the county did not own a single public beach or boat ramp, and major rivers didn’t have an access point that could be considered safe. A small group of people recognized the problem and met with Recreation & Parks Director Rick Anthony and Councilman Chris Trumbauer. That meeting led to the formation of the Anne Arundel Public Water Access Committee (WAC), now a powerful advocacy group of several hundred “wet feet” activists, many representing groups with hundreds and thousands of members. The WAC is the effective voice for those that want but haven’t had safe, convenient public water access.

IN THIS ISSUE

President’s Message.....	1
Public Access and the Future of Bay Restoration.....	1
Methane – Recent Developments.....	2
Profile of a Trustee – Gary Antonides.....	6

CEPA BOARD OF TRUSTEES

- Albert Tucker, President
- Sally Hornor, Vice-President
- Lloyd Lewis, Secretary
- Jeff Short, Treasurer

- | | | |
|--------------------|------------------|--------------|
| Gary Antonides | Lee Greenbaum | Jerry Hill |
| Anson (Tuck) Hines | Mike Lofton | Scott Knoche |
| Joan Turek | William Vosburgh | |

Among the initial tasks of the Committee was an inventory of waterfront land already in public ownership. The results were shocking. The public owns thousands of acres of waterfront land that should be conveniently accessible to all--but has instead been closed to the public that owns it.

Substantial progress has been made over the last decade. More than a dozen new water access points exist, state law amendments support expanded access, and the county's first public boat ramp opened in the Spring 2016 and a second in 2018. The WAC is now the clearinghouse for public water access action, helping anglers, windsurfers, kiteboarders, kayakers, paddle boarders, birdwatchers, trailer boaters and swimmers work with local nonprofits and government on water access projects. A map of the new public water access points has been created by a group of kayaktivists, resulting in the 100-mile Anne Arundel County Water Trail, online at <http://www.aacwt.org>. Yet, a substantial problem still exists. The recreation plan for Anne Arundel County, <https://www.aacounty.org/departments/recreation-parks/forms-and-publications/lpprp-20180904.pdf>, documents public water access as a "primary deficit"

Why Does it Matter?

Certainly, the economic impact of Bay related activity is critical. Anne Arundel's maritime and water-oriented visitor industries are pillars of the local economy. Thousands of jobs, hundreds of businesses and millions of dollars of tax revenue are dependent on safe convenient access to our waterways.

More importantly, the sense of place that evolves from outdoor experiences along the waters of the Bay region often leads to a feeling of shared responsibility for the resources. People who enjoy the outdoors are more likely to become active citizen stewards, engaged in the many conservation and stewardship efforts taking place throughout the region. Despite this, physical access to the Bay and its tributaries—the very resources that form the basis for the Chesapeake's unique identity—is inadequate. This has real consequences for quality of life, for the economy, and for long-term conservation.

There are many reasons to dramatically improve public access to the Chesapeake Bay and its tributaries. Public recreation, quality of life, and economic impact top most lists. In addition, many believe that our failure to move aggressively to reverse the decline in water quality stems from the fact that so few citizens have developed a personal relationship with the Chesapeake. They don't care because they don't have the kind of personal experience with the Bay that creates a passion for action. For a majority of Anne Arundel County residents, access to the Chesapeake Bay and its tributaries is not safe and convenient. Initiatives to advance Bay restoration face continuous threats of reduced funding and reduced regulatory enforcement.

As long ago as 2006, Bill Burton, well known Bay advocate, asked "How can vital citizen support come about to save the Chesapeake without access to it? People must have a taste of the Bay before they are willing to fight and sacrifice for its well-being." (Bay Weekly, 4-12-2006).

In 2020 and beyond CEPA will seek to engage in activities to both improve the quality of life for all and build the base of inspired Bay advocates essential to sustaining the multi-generational effort required for successful Bay restoration. Your ideas are encouraged.

Resources:

- <https://www.nps.gov/chba/learn/news/public-access.htm>
- https://www.washingtonpost.com/local/trump-wants-to-slash-chesapeake-bay-funding-environmentalists-hope-congress-steps-in-again/2020/02/12/ac9c409c-4c60-11ea-9b5c-eac5b16dafa_story.html
- https://www.washingtonpost.com/national/health-science/us-groups-working-to-open-more-public-access-to-chesapeake/2013/07/28/40010d60-f60d-11e2-9434-60440856fadf_story.html

METHANE – RECENT DEVELOPMENTS

By Gary Antonides



Right now, our knowledge of how much methane is entering the atmosphere, as well as its effects, is changing as scientists conduct more studies. At the same time, regulations are being rolled back, and, in large part, don't reflect what we're learning.

<https://www.popularmechanics.com/science/environment/a28858699/what-is-methane/>, By Jennifer Leman, Aug 29, 2019, tells us that methane is a colorless, odorless, and highly flammable gas, and is the main component in natural gas, which is used to generate electricity and heat homes around the world, as well as other industrial uses. Methane (CH₄) is composed of one carbon atom and four hydrogen atoms. It can be produced naturally and synthetically, and when burned in the presence of oxygen, it produces carbon dioxide (CO₂) and water vapor. Methane accounted for roughly 10 percent of all human-driven greenhouse gas emissions in the U.S. in 2017, according to the EPA. While it isn't the most abundant greenhouse gas in the atmosphere, it is among the most powerful. About a quarter of man-made global warming is thought to be caused by methane.

This issue is important right now because the EPA is trying to roll back Obama-era regulations on methane gas. Under the current rules, oil and gas operations are required to install controls that keep methane gas from leaking out of their equipment. But the Trump administration argues that the EPA does not have the authority to regulate methane gas under the Clean Air Act.

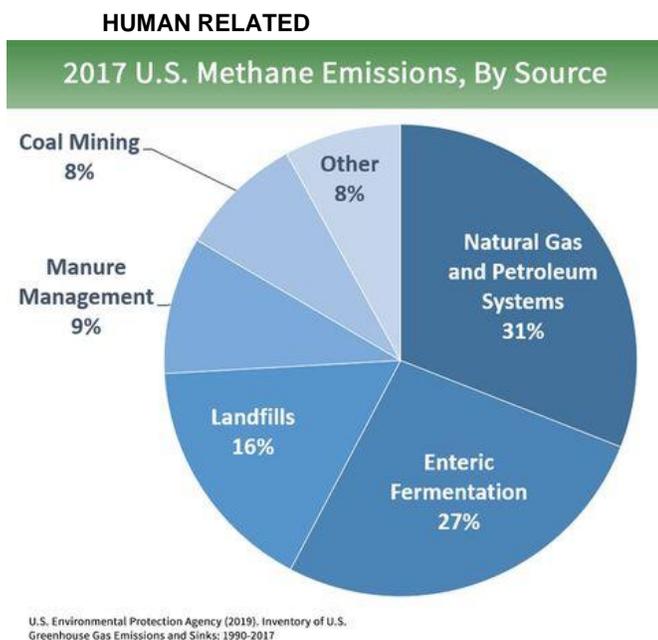
Sources of Methane

There are two main ways that methane can be *naturally* produced. First, methane can be produced as organic matter is decomposed at shallow depths in low-oxygen environments, such as swamps and bogs. As plants die and sink to the bottom of these watery environments, bacteria starts to break them

down. According to a study in the *Proceedings of the National Academy of Sciences*, wetlands are the single largest natural contributor to methane emissions. Second, a form of methane mixed with ice, called methane gas hydrates, can be found trapped in layers of sediment on the ocean floor and beneath permafrost and frozen lakes in the Arctic. These solid, ice-like deposits have been touted as a potential energy source, but there is concern that they may release large concentrated amounts of methane into the atmosphere.

However, according to the EPA, roughly 50 to 65 percent of U.S. methane emissions are related to human activity. Around 30 percent of human-related methane emissions are released by the natural gas and petroleum industry. About 27 percent of methane emissions are generated through enteric fermentation—cows burping and farting while they digest their food, and 16 percent of global methane emissions are generated by organic waste decomposing in landfills. Methane can be also be released through the storage and use of manure for fuel (9 percent) and through coal mining (8 percent).

As for the belching cows, a recent study published in *Science Advances* identified groups of microbes in cows' guts that cause enteric fermentation and suggested that selectively breeding cows to produce less gas might lower emissions. Also, a Yale study found that supplementing cow's diets with a certain kind of seaweed can reduce their methane production by about half.



Methane is one of the most potent greenhouse gases because of its ability to efficiently absorb heat in Earth's atmosphere. However, methane lasts for maybe a decade in the Earth's atmosphere before it begins to react with a free radical called hydroxyl and turns into CO₂, which can last for centuries.

Greenhouse gases are rated according to their Global Warming Potential (GWP). Studies have shown that, over a 20-year period, methane warms the planet over 80 times more than the same weight of CO₂. But the most common figures rate the

gases for 100 years, in which case the GWP of methane is over 30 times as potent as CO₂.

We often hear that carbon dioxide heats Earth's atmosphere and oceans, causing them to expand, but "short-lived" greenhouse gases like methane and CFCs (gases that contain chlorine or fluorine) also spur thermal expansion. In 2017, scientists ran computer simulations that showed thermal expansion caused by methane continues for centuries even after the gas has dissipated from the atmosphere.

Also, there are health problems with methane. It can lead to higher levels of ozone in the atmosphere. Ozone can cause a number of health problems such as shortness of breath and aggravate lung conditions like asthma, emphysema, and chronic bronchitis, according to the EPA.

Using Satellites to Detect Methane

People have been measuring methane in the atmosphere with aircraft and ground instruments for a long time. Now, scientists are beginning to use satellites.

The Economist, in <https://www.economist.com/science-and-technology/2020/01/30/using-satellites-to-spot-industrys-methane-leaks?cid1=cust/dailypicks1/n/bl/n/2020023n/owned/n/n/dailypicks1/n/n/NA/393509/n>, Jan 30th 2020, reports on advances in using satellites for methane detection.

When scanning for emissions in western Turkmenistan in January 2019, a satellite called *Claire* came across three large plumes of methane that appeared to originate from a gas pipeline and a compressor station. The company operating the satellite, *ghgsat*, based in Montreal, informed officials in Turkmenistan, and after a few months the leaks stopped. This incident illustrates two things: satellites can play an important role in spotting leaks of greenhouse gases and, unfortunately, the extent of such leaks is often greatly underestimated.

To see how big the leak in Turkmenistan had been, Daniel Jacob of Harvard University and his colleagues studied the images obtained by this satellite along with observations made by the Tropospheric Monitoring Instrument (*tropomi*), which is carried by a satellite operated by the European Space Agency. The results, published in *Geophysical Research Letters* in November 2019, concluded that during an eleven month period, the three leaks would have released far more than that discharged over four months by a notorious blowout at a natural-gas storage facility in Aliso Canyon, California, in 2015, which is thought to be the worst natural-gas leak yet recorded in America.

There have been other big leaks. In 2018, a group of researchers at the Netherlands Institute for Space Research studied *tropomi* images of a blowout at a natural-gas well in Belmont county, Ohio that took three weeks to control. In a paper published in the *Proceedings of the National Academy of Sciences* in December 2019, the researchers calculated from

the images that the blowout was responsible for the equivalent of a quarter of the annual oil and gas industry's methane emissions in the entire state of Ohio.

Methane can be detected spectroscopically. Like other gases, it absorbs light at characteristic frequencies. With a spectrometer mounted on a satellite it is possible to analyze light reflected from Earth for signs of the gas. As with the satellites that carry them, spectrometers come in many shapes and sizes. *tropomi* can detect other polluting gases, such as nitrogen dioxide, sulphur dioxide and carbon monoxide. It rides in a large satellite weighing about 2200 pounds. The detector has an extensive view, looking at a strip of Earth about 1,600 miles wide with a resolution that means a single pixel in the image represents an area 4.4 by 2.2 miles.

Observing things more closely is the specialty of *Claire*. This 33 pound "nanosat", about the size of a microwave oven, was launched in June 2016 to measure carbon dioxide and methane emissions. With a field of view 7.5 miles wide and a resolution better than 165 by 165 feet, *Claire* can spot leaks from individual industrial plants. *ghgsat* aims to launch two more methane-hunting nanosats later this year.

Claire surveys industrial facilities on behalf of firms that want to monitor their emissions. *ghgsat's* chief executive, Stephane Germain, says employing satellites to do this is more reliable than using terrestrial methods. By the end of the year he plans to roll out a new service. This will provide a digital image of Earth which users will be able to zoom in on to explore continually updated patterns and hotspots of methane emissions. The map will have an average resolution of 1.25 by 1.25 miles.

Other methane-hunting satellites are coming. These include one due for launch in 2022 by *Methanesat*, an affiliate of the Environmental Defense Fund, an American non-profit organization. The 770 pound satellite will scan an area of land 125 miles wide with a resolution of 0.6 by 0.6 miles. According to *Methanesat*, it will be the most sensitive to emission levels yet, and data collected by the satellite will be publicly available.

These satellites will give us a much better idea of how much methane is being emitted, and who is emitting it. It will also make it easier to figure out reasonable measures to manage (and regulate) methane.

Studying Ice Cores for Methane

Thawing permafrost is unlikely to increase global warming according to the study described in <https://www.forbes.com/sites/trevornace/2020/02/25/thawing-permafrost-is-unlikely-to-increase-global-warming-scientists-find/#4cd389cc666e> Feb 25, 2020. Many scientists believed that, as Earth continues to warm, the melting permafrost would release methane gas into the atmosphere, furthering greenhouse gas warming. However, this study suggests that melting permafrost may not have a significant impact on increasing temperatures. The study focused on two types of

permafrost, frozen soil and frozen methane hydrates in the soil underneath the oceans.

Permafrost on land is predominantly found in Siberia, Alaska, and Northern Canada. As plants, algae, and animals die, significant amounts of the carbon are not decomposed but buried in frozen soil. This "locks away" this organic matter. As temperatures warm, the soil begins to melt, introducing liquid water and oxygen to the organic matter, thus allowing bacteria to break it down and potentially release methane into the atmosphere.

Methane hydrates, the other main concern for permafrost melting, are a combination of water ice and methane trapped in frozen ocean sediment below the ocean floor. As oceans begin to warm these hydrates will begin to melt and release both water and methane. In both scenarios, the concern is that a warming planet will cause a sudden release of significant amounts of methane into the atmosphere, thus causing positive feedback and warming the planet more.



Louis Sass, U.S. Geological Survey, GETTY IMAGES

This research, published in the journal *Science*, involved looking at small trapped gas bubbles in ice cores to see what the atmosphere looked like on Earth for the past 15,000 years. By analyzing the gas bubbles, which were sequentially trapped through time and represent past atmospheric conditions, the team believes methane release from permafrost did not play a significant role in warming during past warming events. They studied cores from the last glacial period to modern times, analyzing how permafrost impacted a warming planet. The team found that signatures of methane gas were small during these past warming periods and that methane release from permafrost likely did not cause a large warming event.

In the case of land permafrost, in most scenarios the bacteria decomposed the organic matter through organic respiration, releasing CO₂ as opposed to methane. While the CO₂ released does add to warming, as we stated earlier, each molecule of CO₂ is less potent than a molecule of methane (CH₄).

When looking at methane hydrates in the ocean sediment, the team found that a significant amount of the methane released

never makes it to the ocean surface. It simply dissolves into the ocean water as trapped gas or is oxidized by microbes.

While it is good news that permafrost appears to play a smaller than anticipated role in potential warming, that doesn't mean we shouldn't be concerned with methane as a greenhouse gas. The existing methane came from somewhere, and the results imply that scientists and governments have been undercounting the amount of methane spewing from oil and gas operations, which could be 25 to 40 percent higher than previously thought.

Regulation

Federal efforts to address methane emissions did not begin in earnest until 2014, when the Obama Administration proposed an initial set of regulatory measures to control methane emissions from oil and gas production, coal mining, and landfills. Notably, this did not provide for regulation of agricultural methane emissions, presumably because Congress has prohibited such regulation in each annual appropriations act passed since 2009. In 2016, EPA adopted three sets of methane-related regulations under the Clean Air Act (CAA) to control methane emissions.

Large landfills had to install gas collection systems once their emissions exceeded certain limits. Oil and gas facilities were restricted on gas venting and flaring at new oil wells and required enhanced leak detection and repair at wells and processing facilities. At the time, EPA was fully committed to addressing emissions from existing facilities but, the agency's position changed markedly following President Trump's inauguration.

Also, in 2016, BLM adopted the Methane Waste Prevention Rule to limit methane emissions from oil and gas production on public lands. They required 95 to 98 percent of the associated gas produced from oil wells to be captured, and imposed leak detection and repair requirements on oil and gas facilities.



Methane gas is flared near Carlsbad, New Mexico
© 2019 BLOOMBERG FINANCE LP

Shortly after taking office, President Trump signed an Executive Order directing federal agencies to review and, if appropriate, revise all existing regulations "that potentially burden the development or use of domestic energy resources, with particular attention to oil [and] gas." BLM and EPA commenced

reviews of their requirements. BLM completed its review in September 2018 and rescinded key provisions of their rule. This was immediately challenged in court by California and New Mexico, as well as several environmental groups. EPA's review of its methane regulations is still going on

The 2020 Democratic candidates are already pledging to reverse this action. The administration has argued that its rollbacks are justified, in part, by the fact that firms already have an incentive to reduce leaks, since methane is itself valuable.

Admittedly, because of the fracking boom, the U.S. now produces a lot of gas, and that gas is valuable. The problem is that getting all of that methane from wellheads, to gathering systems, to transmission lines, to distribution lines, and finally to your stove requires a lot of pipe connections. And if those connections aren't made well and aren't maintained, they leak. Estimates of how much methane leaks, and how much is due to fracking, are still highly variable and controversial. One estimate is that oil and gas facilities' leaks are 2.3% of total U.S. gas production, while another estimates a leak rate of 3.5%.

The global warming caused by methane emissions (and other causes) involves a "Social Cost of Carbon" (SCC), which is the cost of damages to human health and productivity, the environment, etc. A recent paper talking about the SCC says these costs are normally ignored by industry and developers. The Obama Administration estimated that the SCC of leaked methane was \$41 per ton of CO₂ equivalent. This is a whopping ten times the private commercial value of the gas.

Absent regulation, oil and gas firms only have an incentive to reduce leaks up to the point where the cost of fixing leaks balances out against the private commercial value of the gas. Economists' usual solution of pricing emissions with a tax or a cap-and-trade program aren't practical. To price emissions you have to measure them, and presently, at least, they're hard to measure. The development of satellite measuring systems helps, but for now, the best regulatory tool is to routinely inspect oil and gas facilities and require fixes when leaks are detected. Unfortunately, the EPA is proposing to undo the Obama-era regulations that did just that.

The Washington Post, "The Energy 202", 3/4/2020, says that ExxonMobil thinks there should be stricter methane regulations and outlined its own guidelines for reducing the methane released by its operations, suggesting the guide can be a model for companies and governments around the world, according to the AP. Some environmental advocates see Exxon's move as a rebuke of President Donald Trump's EPA trying to relax regulations on methane emissions.

While Exxon (and other large oil companies, including BP), don't like EPA's move to roll back these regulations, smaller "independent" firms are generally happy about it. Regulations usually make it easier for larger firms to compete. Large firms can invest in technology to identify and fix leaks at a cost less than that faced by the smaller independents. So, the big firms will have an advantage when competing for oil and gas leases.

The fact that methane regulations are likely to disproportionately affect small firms means that we should help provide technology and expertise to smaller firms.

As described in "The Status of Methane Regulation in the U.S.," January 31st, 2020, *By Romany M. Webb* (<http://blogs.law.columbia.edu/climatechange/2020/01/31/the-status-of-methane-regulation-in-the-u-s/>), House Democrats, to counter what the EPA is doing, on January 28, published a draft of the "CLEAN Future Act" which aims to "achieve net zero greenhouse gas pollution," among other things. An important component of the plan is stricter regulation of methane. Along with the CLEAN Future Act, lawmakers are currently considering five other bills, aimed at preventing the Trump administration from rolling-back existing methane regulations. It is expected that these are likely to be staunchly opposed by the Trump administration. But their introduction is significant in itself, and suggests that methane regulation may soon be a federal priority again.

PROFILE OF A TRUSTEE
Gary Antonides

Gary Antonides was born in Pensacola, Florida, the son of a Navy pilot who moved often while Gary was growing up. Gary went to the Naval Academy, spent four years on sea duty and two as a math instructor at the Academy before becoming a civil servant, working at the Naval Ship R&D Center, dealing mostly with ship vibration. While employed there, he earned a degree in Engineering Mechanics from Catholic University. He then worked for a defense contractor, and finally as a consultant before he retired. His last few years were spent mostly working with the Navy, Coast Guard, American National Standards Institute, and others on a new set of vibration specifications for ships.

Gary has been involved as a volunteer in a number of organizations and has held various offices in the community. The organizations include the Boy Scouts, his church, his community recreation center (swimming pool), in Herndon, VA, and, since moving to Edgewater in 1980, the Loch Haven Civic Association and the Annapolis Sail & Power Squadron as well as CEPA. He was exposed to various environmental issues while on the Board of the Loch Haven Civic Association, including those associated with the building of the Mayo Peninsula wastewater system.

He became a Trustee of CEPA in 1998 and has served as President, Vice-President and Treasurer of CEPA, and is still very involved with many of the issues CEPA is addressing. His primary task with CEPA now is acting as the editor of the CEPA Newsletter.

His main avocation has been boating, primarily taking a trailerable, trawler type cruising boat to new (for him) rivers, lakes, and coastal areas across the U.S. (and sometimes Canada) and exploring those areas and the history associated with them. Various friends and family serve as crew.



CEPA MEMBERSHIP

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

Name _____

Address _____

Phone _____

Email _____

Enclosed is:

- \$30. for my CEPA membership
- \$50. for my Sponsoring CEPA membership
- \$100. for my Sustaining CEPA membership

Newsletters:

- Please send me emails when the newsletters are posted.
- Please send hard copies of the newsletters to me by mail



CEPA
P.O. Box 117
Galesville, MD 20765