



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

**NEWSLETTER**

**Winter 2020-21**

**PRESIDENT'S MESSAGE**

*By Al Tucker*



Most environmental groups in the Chesapeake Bay region focus on the cleanup of the Bay. CEPA has been no exception since its founding over 50 years ago. We have noted that the primary cause of the Bay's degradation has been uncontrolled development coupled with poor stormwater management, poor agricultural practices, and

minimally treated wastewater. Now the acceleration of climate change represents an even greater challenge to the Bay's cleanup efforts.

In 1983, the EPA and the Bay's watershed states recognized that solving the Bay's "dirty water" problem required a holistic or systems approach. They agreed to reduce the total maximum daily load (TMDL) of three major pollutants<sup>1</sup>, namely, sediment, nitrogen, and phosphorus. Each state agreed to reduce its proportionate share of these pollutants to levels that the current Bay's ecosystem could consume through natural processes. While some progress has been made, the Bay still receives a grade of D overall. It remains an open question whether or not the current approaches will succeed when another environmental driver emerges as an even greater threat to the Bay's ecosystem. Specifically, climate change.

**Climate Change is Real!** We know that carbon dioxide, methane and hydrofluorocarbons increase the heat trapping effects of the atmosphere. The increases in carbon dioxide and methane are related to burning fossil fuels, and, ironically, hydrofluorocarbons are used in cooling for refrigeration and air conditioning. The major indicators of these greenhouse gas effects were outlined in the fifth International Climate Change Committee Assessment Report:

**Global Warming:** Since the 19th century, the average air temperature has risen about 1.2 °C (2 °F). The predictions now show that the 1.5 °C Paris agreement limit will be exceeded in the period between 2026 to 2042. And the 2°C limit will occur during the period from 2038 to 2072, if no intervention is taken. The focus on day-time high temperatures belies the rise in

average night-time temperatures, which have the greatest impact on the length of growing seasons. Extended growing seasons disrupt normal cycles as well as invite invasive species that thrive in higher temperatures. Animals that live by temporal cycles will migrate to their normal territories only to find food supplies depleted or nonexistent when they arrive.

**Warming Oceans:** While the ocean temperature has risen only 0.33 °C, it is the primary cause of sea level rise through thermal expansion. Currently, oceans store 90% of the earth's excess energy. What that storage limit is before the atmospheric temperature begins to rise rapidly remains an open question.

**Shrinking Ice Sheets:** Greenland loses about 279 billion tons of ice per year while Antarctica loses an additional 148 billion tons. At some point their contribution to sea level rise will dominate that of thermal expansion. Greenland alone can contribute up to 20ft of rise. If the 2 °C limit is reached, one could expect a meter or more of rise in the Bay. The northeast coast of the US including the Bay is experiencing one of the fastest rises due to a combination of subsidence and the impact of Greenland meltwater on the Gulf Stream. Anne Arundel will lose almost 3000 acres of forest to sea level rise.

**Ocean Acidification:** The ocean is one of the primary carbon sinks. Carbon dioxide in seawater creates carbonic acid. This natural process has caused a 30% increase in acidification, resulting in destruction of coral reefs and impacting calciferous marine life. In the Bay, crabs and oysters will be affected.

**Extreme Events:** As one watched the development of hurricanes this summer and fall, we saw them move over land and back over warm water, where they increased quickly in intensity, some to category 5 storms. Warmer air holds more water, and this year may be the wettest year in our weather history. More water means that current stormwater practices may be inadequate. While global warming implies hotter temperatures on average, it also means some of the coldest. With 22 events causing 95 billion dollars of damage, the year 2020 represents the sixth consecutive year of climate related losses exceeding a billion dollars. From 1980 to now, the US has averaged 7.2 events per year. From 2015 to now the average is 16.2 events. For the Bay, significant storm surges during hurricanes can be expected. Under appropriate conditions, a surge in the Bay that exceeds 18ft can occur at Fells Point in Baltimore.

Within two generations, climate change will rapidly change our local environment. The question is, what should we do? First and foremost, without a reduction of greenhouse gases, the eventual results will be catastrophic. At the national and global

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level, we should advocate for decarbonizing our society. That means we will need a new energy infrastructure independent of fossil fuels. Without making this change, all other attempts to adapt will be futile.

Some recent reports indicate that the 2°C increase is already “baked in.” At the regional level of the Bay, that fact implies that extreme events will occur within our lifetime. Blackwater refuge will lose 50% of its land to inundation. Large tracts of the Eastern Shore cropland already exhibit saltwater intrusion in plant root zones. Well water in some areas also shows signs of saltwater intrusion.

All these effects imply that we in the Bay’s watershed will need to change our strategies from preventing change and preserving the status quo to ones of adapting to a changed environment. Hard decisions will have to be made. Land and homes will have to be abandoned, critical infrastructure like roads, wastewater facilities, and wells will have to be hardened against storm surges. New building codes will need to be developed for areas that will become subject to future flooding. It is not just the low-lying areas that will be affected. The whole state will have to bear the economic, societal and ecological costs associated with the unforeseen, myriad effects of climate change. The Maryland Commission on Climate Change produced an excellent summary in 2011<sup>2</sup>. Unfortunately, little has resulted from these recommendations; perhaps because they are too far reaching and the cost to implement them is too daunting. Even more daunting, though, is the fundamental change in attitudes and lifestyle choices that we will have to accept. These choices can be ours to make or the climate inevitably will make unpleasant choices for us. We need to tell our decision makers that the time is now to start preparing for the inevitable.

<sup>1</sup> Technically these pollutants are nutrients. Nitrogen and phosphorus are required by all living things, but too much of either causes imbalances in the ecosystem, especially at the microscopic level which affects the food and environment for larger marine life. Sediment is important also. The natural function of rivers transports sediment, think of the formerly rich ecosystems of the Nile, Mekong, and Mississippi Deltas. In the Bay, the larger sediment particles are critical support to underwater grasses. But dams impede this “good” sediment and allow suspended sediment to flow past and ultimately to block the photosynthetic light required by underwater grasses.

<sup>2</sup> [Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change Phase II: Building societal, economic, and ecological resilience](https://climatechange.maryland.gov/reducing-marylands-vulnerability-to-climate-change-phase-ii-executive-summary/), <<https://climatechange.maryland.gov/reducing-marylands-vulnerability-to-climate-change-phase-ii-executive-summary/>>

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## POLYFLUOROALKYL SUBSTANCES (PFAS) or “FOREVER CHEMICALS”

*By Bill Vosburgh*



The aptly nicknamed “Forever Chemicals” represent a threat to all of us. Detectable levels of these compounds can be found in nearly everyone’s blood. Over 2,000 of these compounds were developed to make our lives easier before issues of toxicity arose. Developed in the 1930’s, Teflon or poly-tetra-fluoro-ethylene (PFTE) was among the first of this class

and used on nonstick cookware. Teflon itself is not toxic unless overheated, yet the manufacturing process created many dangerous byproducts that were let loose into rivers as waste. Real life insights can be found in the movie Dark Waters (2019). It covers the litigation in West Virginia by workers and residents suffering serious illness from poly-fluoro-octanoic acid (PFOA or C8) used in the production of Teflon. Since 2013, PFOA has not been used in its manufacture in the USA.

<https://www.healthline.com/nutrition/nonstick-cookware-safety>

The chemistry of these compounds is the basis of their functional success for consumer products as well as their scourge upon the environment. Long chain carbon molecules with fluorine atoms instead of hydrogen create strong chemical bonds that give hydrophobic (water shedding) properties to these products. Very slippery industrial coatings, fabric treatments, nonstick kitchenware, and firefighting foams are among the uses. However, the strong chemical bonds mean the compounds almost never break down, and accumulate in ground water, soils and living beings. A good primer on this is <https://www.niehs.nih.gov/health/topics/agents/pfc/index.cfm>

Nondegradable does not necessarily mean inert. Many PFAS compounds appear harmless to people, but others have insidious links to birth defects, endocrine disruption and cancers. These were easily seen in workers exposed to high levels and caused more investigational studies. It has taken years for analytical methods to improve enough to plumb the depths of PFAS toxicity. The federal Environmental Protection Agency advisory level for remediation is at 70 parts per trillion. Yes, not parts per million or billion but as few as 20 parts per trillion in some states’ regulations for drinking water. Seventeen states have passed regulatory laws for maximum allowable PFAS in their water while the EPA has not.

With incredibly low recommended levels in drinking water, soils and food, the state of Maryland has not yet passed legislation to set legal PFAS standards. Quite the opposite, only Maryland passed a law allowing their use (April 2020). Our regional problem is mostly sourced at airports and military installations throughout the Maryland watershed. The current main culprit for PFAS pollution is the use of firefighting foam in real or practice events. Residues can gradually spread to streams, ground water and the Chesapeake Bay. ([https://www.ewg.org/interactive-maps/pfas\\_contamination/map/](https://www.ewg.org/interactive-maps/pfas_contamination/map/))

Once people are no longer exposed to these chemicals blood levels slowly decline. Stopping the production and use of PFAS compounds, and the remediation of contaminated sites may be exceedingly difficult and expensive. The contamination of aquifers by runoff, uncapped wells or even intentional aquifer recharge leaves us no clear path to prevent a serious long-term event. There may be an increased dependence on municipal and home water purification systems. Activated charcoal filtration will trap these compounds and may be the only low-cost alternative. Like the asbestos debacle, the litigation is already gearing up. The EPA and Maryland Department of the Environment need to step up to solve this with more studies, guidance and legislation. The problem is not just nationwide but global and it won't just go away.

## SHOULD WE PRESERVE HALF THE EARTH FOR WILDLIFE?

By Gary Antonides



The International Union for Conservation of Nature (IUCN) says that more than 28,000 *known* species of animals and plants are threatened with extinction, according to a 2019 National Geographic article. That number actually grossly understates the risk since the IUCN has been able to assess the survivability of only about

106,000 species of the more than 1.5 million species of animals and more than 300,000 plant species that scientists have described and named. Also, they think that the *named* species represent less than a quarter of what's really out there. (<https://www.nationalgeographic.com/animals/2019/09/vanishing-what-we-lose-when-an-animal-goes-extinct-feature/>). The amount to which they are understating the risk is indicated by a recent United Nations report on the biodiversity crisis, which estimated that extinction threatens up to a million animal and plant species, known and unknown.

Habitat loss, driven primarily by humans developing land for housing, agriculture, and commerce, is the biggest threat facing most animal species, followed by hunting and fishing. Even when habitat is not lost entirely, it may be changed so much that animals cannot adapt. Fences fragment grasslands and logging cuts through forests, breaking up migration corridors; pollution makes rivers toxic; pesticides kill widely and indiscriminately. Also, international trade spreads disease and invasive species from place to place. And, eventually, climate change will affect every species on Earth. All of these threats lead, directly or indirectly, back to humans. Most species face multiple threats. Some can adapt to us; others will vanish.

If we lived in an ordinary time, observing a long, unhurried geologic epoch, it would be nearly impossible to watch a species vanish. Such an event would occur too infrequently for a person to witness. In the case of mammals, which are the best-studied group of animals, the fossil record indicates that the "background" rate of extinction, the one that prevailed

before humans entered the picture, is so low that over the course of a millennium, only a single species might disappear.

The ICUN lists more than 200 mammal species and subspecies as critically endangered, and it is expected that similar numbers apply for just about every other animal group: reptiles, amphibians, fish, even insects. Extinction rates today are hundreds, perhaps thousands, of times higher than the background rate. They're so high that scientists say we're on the brink of a mass extinction.

The last mass extinction, which did in the dinosaurs 66 million years ago, followed an asteroid impact. Today, there are multiple causes of extinction, but they are all due to humans. The great naturalist E.O. Wilson has noted that humans are the "first species in the history of life to become a geophysical force." Many scientists argue that we have entered a new geologic epoch – the Anthropocene, or age of man.



A Bald Uakari Monkey in the Amazon. The IUCN lists this species as vulnerable. Photo: Alamy

### E.O Wilson's Half Earth

Wilson wants us to set aside half of the planet as protected areas for nature. He is one of the world's most respected biologists, and, in his 2016 book "Half Earth: Our Planet's Fight for Life," he has proposed his radical and challenging idea of setting aside half of the planet as nature preserves.

In his book, Wilson says that half of both terrestrial and marine ecosystems should be set aside for nature, and says it's time for us to set a big goal instead of aiming for incremental progress. "People understand and prefer goals," he writes. "It is further our nature to choose large goals that, while difficult, are potentially game-changing and universal in benefit."

The reason why half is needed is derived from the science of ecology. The principal cause of extinction is habitat loss." With a decrease of habitat area (A), the sustainable number of species in it (S) drops according to the "species-area curve" which varies with the particulars of the species and area involved, but commonly follows the trend:

If A is reduced by:	Existing species that will survive
50%	80%
70%	70%
90%	50%

Note that these are changes, so having half the earth "conserved" would be a reduction in A of less than 50% since parts of it are already conserved.



*Blue Poison Dart Frog. Amphibians are already suffering from an extinction crisis. Photo: Alamy*

If protection efforts focus on the most biodiverse areas (such as tropical forests and coral reefs), we could potentially protect more species than the curve would indicate. In contrast, if we only protect 10% of the existing undeveloped area on Earth, we are set to lose around half of the planet's existing species over time. With current policies, this is the track we are now on.

"The extinction rate our behavior is now imposing on the rest of life, and seems destined to continue, is the equivalent of the asteroid strike that wiped out the dinosaurs played out over several human generations," Wilson writes in *Half-Earth*.

According to the World Database on Protected Areas, the world has protected 15.4% of terrestrial area, including inland waters, as of 2014. But protection of the oceans lags far behind with only 3.4% of marine environments under some form of protection.

Unfortunately, conservation has a long history of forcibly moving indigenous and local people out of areas to make way for protected areas. But Wilson says that the Half Earth goal should include indigenous territories. This has become increasingly common in Latin America and Australia and could play a big role in other places. These areas are increasingly seen by conservationists as key in the fight to protect nature. For example, indigenous territories currently cover around 13% of Brazil, including massive chunks of the Amazon rainforest. Wilson says that indigenous people "are often the best protectors" of their own lands. Even so, most indigenous people still lack rights to their customary lands.

Wilson points to Gorongosa national park in Mozambique as an example of how protected areas, if managed well and funded, can actually benefit local people. "The maintenance and expansion of this magnificent reserve has been enhanced by the improvements in agriculture, health, education, and new jobs in buffer zones. The same effect is demonstrable even within industrialized nations." Indeed, recent research has found that protected areas may improve the conditions of local communities (Uganda, Thailand and Costa Rica are examples) instead of impoverishing them.

So the half-Earth goal would not mean banning people from half of the planet's land area, but keeping these areas undeveloped. Nature reserves would not have to ban all human activities, but could incorporate various activities in some areas. The US National Park Service has begun the practice of designated preserves within the park boundaries where hunting and fishing are allowed.

Wilson insists that current property rights would not have to be taken away. Instead, governments could use various incentives to support nature conservation on private property. Wilson pointed to the US's National Nature Landmarks program as an example. It encourages landowners to protect important



*Laughing Haurani women and children in the in the Bamenó Community, Ecuador's Yasuni National Park. Photo: Alamy*

biological and geologic sites. However, in order to protect half of the planet, incentive programs like these would need to be drastically scaled up and receive far more funding.

But is setting aside half of our land for nature even possible? In 2005, scientists with the University of Wisconsin-Madison estimated that humans used around 40% of the world's land area already for farming (an additional 3% of land area is taken up by urban development). The percentage of land devoted to agriculture has certainly gone up since then, and the global population has risen by nearly a billion people.

As an example of measures that could be taken, since 75% of our agricultural land area is currently devoted to growing crops for livestock consumption, the amount of land required for agriculture today could be drastically reduced if people ate significantly less meat and livestock products.

Degraded or abandoned lands, of course, could also be rehabilitated and rewilded with species, tools that are increasingly popular among conservationists today. But, again, such activities would need to be drastically increased in order to achieve the half-Earth goal.

Relatively speaking, protecting half of the oceans would be far more straightforward. In addition to protecting portions of their coastlines, nations would have to come together to agree to restrict fishing in a significant percentage of the high seas, and exempt them from any future mining or fossil fuel extraction.

Again, habitat loss isn't the only threat to biodiversity today. We mentioned a barrage of other impacts, but biologists agree almost unanimously that habitat loss remains the biggest threat. And protecting more of the planet could also contribute to solving other environmental problems, including climate change.

### **30 by 30**

As an interim goal, a "30 by 30" strategy is gaining popularity. This calls for conserving 30% of our land and water by 2030. *Scientific American*, in "An Ambitious Strategy to Preserve Biodiversity," By David Shiffman, 10/4/2020 discusses this plan. (<https://www.scientificamerican.com/article/an-ambitious-strategy-to-preserve-biodiversity/>)

The 2020 Democratic Party platform addressed many issues that excited scientists and environmentalists, including climate change, the return of science-based decision making to the EPA, and environmental justice. Its endorsement of the 30 by 30 plan, however, has received very little notice. The inclusion of a statement like this in a national party platform represents the largest boost for U.S. biodiversity conservation policy since the Endangered Species Act.

Representative Deb Haaland (D–N.M.) was a member of the Platform Drafting Committee, the author of a 30 by 30 resolution in Congress, and Biden’s choice for Secretary of the Interior. She stated “Vice President Biden is committed to making the country more resilient to climate change and securing environmental justice, so I suggested that including the goal of conserving 30 percent of America’s lands and oceans by 2030 would be a perfect fit for his platform.”

The 30 by 30 goal isn’t new, and it isn’t radical eco-extremism. This goal has been discussed for years by the science-based conservation community and has been examined in peer-reviewed scientific journal articles and detailed reports from well-respected nonprofits like Defenders of Wildlife and the Center for American Progress. In addition to a resolution in support of this goal being introduced in Congress, it has been introduced in several state legislatures including that of South Carolina, hardly a hotbed of far-left activism.

According to Lindsay Rosa, a senior conservation scientist at Defenders of Wildlife’s Center for Conservation Innovation, the most commonly used figures suggest that currently about 12 percent of U.S. land and 26 percent of U.S. waters are protected, but there is a lot of land that’s important for biodiversity conservation that isn’t yet protected, and should be. “About 80 percent of our highest-biodiversity hotspots are currently not protected,” Rosa says. “We have a long way to go.”

It’s also important *which* 30 percent we protect. Conserving a giant, undeveloped stretch of land with little life that no one wanted to develop anyway is not very helpful to either biodiversity conservation or climate resilience. We need to protect at least some of every major ecosystem, habitats that species of concern live in. That should be obvious but it is often ignored when good scientific input isn’t heeded.

Other important points:

- + When we’re dealing with migratory species, it’s important to protect their migratory routes and not just their destination.
- + Obviously, human needs are vital when determining which habitats should be off-limits to large-scale resource extraction and development.
- + While some top-down (Federal) coordination is necessary, local involvement is critical, especially concerning natural resource management on Indigenous lands. “We need *continued* U.S. leadership to reach the goal of 30 by 30,” Justin Kenney, the director of the 30x30 Ocean Alliance, stated. “And it’s gaining more and more momentum!”

A national program to enact 30 by 30 would involve a series of new national parks declared by the President, but it would also

include things like national wildlife refuges, national monuments, state-level protected areas, conservation easements on private land, and co-management with tribal leadership.

Does such a bold, ambitious, science-based environmental plan have a chance of happening in our hyperpolarized government? It really does, because conserving wildlife and wild places often has huge bipartisan support. In fact, 86 percent of voters support the specific goal of 30 by 30, including 76 percent of Republican voters, according to a poll conducted by the Center for American Progress.

30 by 30 represents the last best hope for saving many of the United States’ iconic species and wild places. It wouldn’t have happened if Donald Trump was reelected. Not only was there no pledge like 30 by 30 in President Trump’s campaign materials, but he has focused on removing such protections. The Center for American Progress has described him as “the only president in U.S. history to have removed more public lands than he protected.”

*Scientific American* broke their precedent of not endorsing presidential candidates to endorse Joe Biden and noted that Biden “has a record of following the data and being guided by science.”

The Sierra Club is also supporting the 30 by 30 plan. ([https://www.sierraclub.org/sites/www.sierraclub.org/files/program/documents/30x30Conservation\\_Lands\\_FactSheet\\_07\\_web.pdf](https://www.sierraclub.org/sites/www.sierraclub.org/files/program/documents/30x30Conservation_Lands_FactSheet_07_web.pdf)). They say that leading conservation scientists, indigenous leaders, and international organizations like the UN International Convention on Biodiversity believe that in order to stop the dual extinction and climate crises and preserve clean water, clean air, and a stable climate, we need to protect 50 percent of the planet by 2050. And, to meet that goal in the US, we need to protect 30 percent of our remaining undeveloped natural areas by 2030. It’s an ambitious goal, but one that’s achievable.

The Sierra Club also says sixty percent of lands in the continental US are in a largely natural condition or could be restored to a natural condition. Further, the US ranks as one of the top five countries in the world for remaining wilderness quality lands. The policies that need to be implemented are neither complicated nor entirely new. Federal, state, and local governments have an extraordinary range of conservation powers—from the executive reach of the president to the zoning authorities of city councils. We’ll need to utilize all of them. On national public lands, for example, we could include protections for roadless forest lands, wilderness and national monument designations, moratoriums on oil and gas leasing, and wetlands restoration. At the state and local government level, that could include new and expanded state-funded open-space programs, designation of wildlife corridors, and the creation and expansion of state and local parks. Implementing the conservation and stewardship policies of Tribal Nations on traditional and cultural lands could also result in significant additional protections. Protecting 30 percent of the US by 2030 represents the kind of transformative change that is needed to safeguard nature in America.

**IN MEMORIAM**  
**Lee Greenbaum**



CEPA is saddened to learn of the passing of a long time CEPA Trustee, Leon Jack Greenbaum, Jr., on November 5<sup>th</sup>. He was very active in the community for many years. He joined CEPA in 1999, and served in various capacities including as President from 2005 to 2007.

Lee was born in Baltimore in 1923. He got his BS from Loyola College in 1947 (Physics and Biology), and, in 1962, he earned a PhD in physiology from the University of Maryland's School of Medicine.

He had an unusual 30-year career with the Navy, serving during WWII (with a Patrol Bombing Squadron in the Pacific Theater where he was awarded the Distinguished Flying Cross) and during the Korean War as a Naval aviator. In 1963, he qualified as a Naval diver, and worked in the Deep Submergence Program and submarine rescue at the USN Experimental Diving Unit, and as Chief of Diving Research. He retired from the Navy as a Captain in 1973.

He entered the U.S. Public Health Service and worked at the National Institutes of Health, where he was responsible for scientific review of grants in the areas of stroke, head and spinal cord injury, MS, and Parkinson's Disease. He is the author of about 30 scientific publications, co-authored two texts on diving and submarine medicine, and was editor of three texts on diving and undersea warfare. He became the Executive Director of the Undersea and Hyperbaric Medical Society in 1986.

He lived with his wife Betty on Whitemarsh Creek off the Rhode River. He organized the Carr's Wharf Community Association and served as its first president. He was appointed to the Small Area Planning Committee for Edgewater/Mayo.

He has been an avid sailor for many years. He organized and was Commodore of the Chesapeake Tartan 30 Association. He organized the Annapolis Naval Sailing Association and served as its first Commodore. He was Cruising One Design Chairman of the Chesapeake Bay Yacht Racing Association.

Lee said his love of the Bay began when he was a camper at Camp Wright, a church camp on Kent Island, and he saw the Bay when there was minimal pollution (1930s). As a sailor, he has travelled the Bay from one end to the other, and cruised almost all of its rivers and many of its creeks.



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