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

NEWSLETTER **Spring 2013**

PRESIDENT'S MESSAGE

By Al Tucker, President, 2013

What is a sustainable fishery? Our recent forum on "Healthy Bay, Healthy Fisheries?" provided some insights to the answer to that question. The simple answer is that its harvest should not exceed what can be replenished by a natural cycle. But the forum brought out many complicating factors that fishery managers must consider, and it showed why individual fisheries cannot be properly managed without considering the rest of the ecosystem of which it is a part. Marine scientists have shown this to be true, but fishery management techniques have not kept up with the science.

Sustainability is often cast in terms of the subcategories: economic, social and environmental sustainability. More succinctly, it is cast as the "triple bottom line" or "the three p's": profit, people and planet. In the not too distant past, the concepts of social and environmental sustainability were not given much importance. Economic growth drove suburban sprawl, agricultural production, as well as overfishing of the Bay's most profitable fisheries. Each outcome proceeded without restraint, while, at the same time, individual fisheries were treated independently from one another.

Unrestrained economic growth has come at the expense of societal and environmental sustainability. The traditional model of managing a single species by commercial fishery interests and the government managers representing societal interest has failed. The reason is that these interests do not account for the interdependence of multi-species fisheries or the environmental impacts of water quality, wetland restoration or land development. While the Chesapeake Bay Program is focused on implementing TMDLs, it does not have a fisheries component. The sustainability of one fishery depends on the sustainability of all the others, and, as we now know, each is dependent also on good water quality and maintaining healthy wetlands.

IN THIS ISSUE:

The discussions at the forum provided a more complex definition of sustainability. See Gary Antonides' summary of the forum below, and the presentations at www.cepaonline.org. In the past, the natural abundance of the Bay sustained both economic and social interests without a negative impact on the environment. Now world-wide population growth has fueled the demand for the Bay's bounty, and, at the same time, effluent of nutrients and sediment from regional population growth and agriculture have conspired to limit the capability of the Bay to maintain previous levels of production. Overfishing and pollution are now the key restraints on fishery production.

We now know from an environmental standpoint that everything in the Bay is interconnected: the biota in watersheds, the wetlands, and the grassy shorelines that provide food and the habitat critical to the health of the main stem of the Bay. Overfishing in the main stem of Bay can impact the balance of biota in the riparian areas of the watershed. To effectively assess the health of any given fishery and to determine the best way to maintain it, its entire ecosystem must be considered.

The National Marine Fisheries Service outlined eight basic considerations of ecosystem management in a report to Congress in 1999[i], namely:

1) The ability to predict ecosystem behavior is limited.
2) Ecosystems have real thresholds and limits, which, when exceeded, can effect major ecosystem restructuring.
3) Once thresholds and limits have been exceeded, changes can be irreversible.
4) Diversity is important to ecosystem functioning.
5) Multiple spatial and temporal scales interact within and among ecosystems.
6) Components of ecosystems are linked.
7) Ecosystem boundaries are open.
8) Ecosystems change with time.

In 2006 the Science and Technical Advisory Committee of the Chesapeake Bay Program developed a detailed plan for the Bay[ii]. The plan calls for participation of all the stakeholders of the ecosystem. In addition to the traditional stakeholders (commercial fishing interests and government managers), it includes habitat stakeholders, recreational fishers, boating and tackle industries, commercial shippers, land planners and most importantly, water quality managers. This approach will not be easy to implement. Each stakeholder will have to make concessions for the common good. Setting goals that represent the common good will be the most difficult and, perhaps, contentious task for the stakeholders. As an example of the tough decisions ahead, at the forum, Tom Miller estimated that the harvest of striped bass would have to be cut by more than a factor of two to properly manage a five-species ecosystem. There are difficult choices to be made, and without facing these choices, the future of the Bay is unknown.

Implementing an ecosystem management approach will require political action in a difficult time. The plan was developed in 2006, yet little has been done to implement it

(Pres. Message - cont'd from page 1)

through policies and regulations that will benefit the stakeholders. The plan calls for a set of complex actions, which require funding. Unless action is started immediately, the rapidly ensuing changes brought about by climate shifts as well as the other stressors already mentioned will overtake the present programs to improve the Bay, and, thus, make controlling and adapting to them extremely difficult.

[1] Ecosystem-Based Fishery Management (2006) http://www.nmfs.noaa.gov/sfa/EPAPrpt.pdf

[2] Fisheries Ecosystem Planning for Chesapeake Bay (1999) http://chesapeakebay.noaa.gov/images/stories/pdf/FEP_FINAL.pdf

CEPA'S ANNUAL FORUM

By Gary Antonides

CEPA held its annual forum, entitled "Healthy Bay, Healthy Fisheries? - Managing the Future of the Bay" on Friday, April 20th at the Smithsonian Environmental Research Center. The program included three distinguished figures actively involved in Chesapeake Bay fisheries management. Dr. Al Tucker, CEPA President, made the introductions.

Dr. Tom Miller, Director of the University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory (CBL) spoke on *Fisheries Management Practices*. Tom was initially appointed to the CBL faculty in 1994 following four years post-doctoral training at McGill University where he worked on ecology and reproductive dynamics of Atlantic cod off Nova Scotia. During his career, his work has varied from studies of fish early life history in the northwest Atlantic and Lake Michigan to the role of small-scale turbulence in regulating feeding in planktonic organisms to the role of adult movement in regulating the population dynamics of skates. Since 1997, Tom and his research group have conducted a considerable amount of research on the dynamics of blue crabs from New York to Florida. Since 2001 he has led efforts to develop a sustainable approach to the management of blue crabs in the Chesapeake Bay. Most recently, his research has focused on both recruitment issues in menhaden and striped bass and stakeholder involvement in recreational fisheries. His work has been funded by a diverse array of agencies including NSF, NOAA, EPA, Maryland Sea Grant and the Gordon and Betty Moore Foundation.

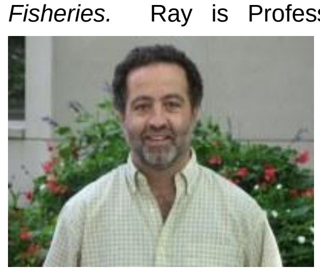
Tom described the traditional approach to fisheries management which assumes that the amount of a fish of a particular species is affected positively by recruitment (reproduction) and negatively by fishing and death by other means, and each species is considered independently. The only quantity managed in this scheme is the amount of fish harvested, and that is based on the amount of that species present. The only stakeholders participating in the management decisions were commercial fishing interests and the "managers" who were looking out for society's interests.

This approach did not account for recruitment, which is an indicator of future abundance. Recruitment of forage fish such as Menhaden can vary by a factor of 10 to 100 from one year to the next. Nor did it consider the interaction of the species, primarily the relationships between predators and prey. Further complicating the picture is the use of land in the watershed, the pollution from that or other sources, and any restoration efforts. The models scientists use to look at fisheries are getting more refined and now consider most of these factors to some extent, but the interaction of the ecosystem with humans (growth, pollution) is hard to predict.

From Tom's experience, the most important factor in fisheries management is getting the right stakeholders and using their inputs. In addition to the traditional stakeholders, recreational fishermen, those working with land use, and multiple government and non-government organizations should be included. The stakeholders should work out the goals with each other -- they should not be determined by scientists or the government. Tom found this normally results in realistic and sensible goals. The scientists, with their models, can tell the stakeholders what options are likely to achieve the goals, and the stakeholders can then make recommendations for specific actions. The allocation of the catch is the most contentious issue, and that cannot be determined by scientific models.

Due to the interactions of the species, restrictions of individual species is often not the best management tool. Tom advocates restricting the total biomass harvested, or limiting catches to certain ratios of species. Both schemes have been proposed and require the stakeholders rather than the managers to agree on an equitable division of the catch. Looking at future fisheries management, Tom feels the important things are to improve stock assessment and data collection, and to set goals involving the right stakeholders.

Dr. Raymond Najjar spoke on *Environmental Shift Impacts on Fisheries.* Ray is Professor of Oceanography with the Department of Meteorology at Pennsylvania State University. His research covers two areas: marine biogeochemistry and the impact of climate change on estuaries. He has worked on several climate impact assessments in the Mid-Atlantic Region of the United States. Current research is focused on the nitrogen and carbon cycles of coastal waters of the eastern United States and long-term salinity change in the Chesapeake and Delaware Bays. He currently serves as a Pennsylvania-appointed member of the Science and Technical Advisory Committee of the Chesapeake Bay Program. At Penn State, he teaches courses in meteorology and oceanography.



Ray first gave some statistics on climate change. Temperatures have risen about 2 degrees F since 1960. Sea level rise since 1930 has been about 6 inches globally, and almost twice that in this area due to subsidence. Studies show that there is a 99% chance that we'll have higher carbon dioxide levels and sea levels in the future. There is more than a 90% chance that temperatures will rise and we'll have more winter and spring precipitation. There is more than a 66% chance that storms and precipitation will be more intense. By 2100, the surface temperature of the Bay will be the same as South Carolina's waters are now *if* we manage to lower our emissions, but the same as Florida's waters if we don't.

Climate change affects fish through temperature change, dissolved oxygen, submerged vegetation, acidity, salinity, circulation, food, and the timing of seasonal changes. To look at one of these a little closer, consider dissolved oxygen (DO). Most fish need somewhere between 2 mg/l (Spot) and 6 mg/l (Striped Bass) of DO. Crabs need 3 mg/l. Decreases in DO are caused by high spring flows, high temperatures, and high carbon dioxide, all of which are happening. After considering this and all the other factors, it is expected that a number of species will be pushed out of the area: Yellow and White Perch, Striped Bass, Soft Clams, and Summer and Winter Flounder among them. However, some of the species that are likely to move into the Bay include some types of shrimp, Southern Flounder, Spanish Mackerel, Tarpon, and Spot.

There will be advantages and disadvantages to climate change. For example, there will be longer growing seasons for many species and less shoreline freezing. On the other hand, oyster diseases have moved north with increasing temperatures in the past. Another problem is that high acidity interferes with the growth of shells in shellfish.

Ray says we need to "manage the unavoidable" (adapt to inevitable changes) and also "avoid the unmanageable" (referring to the harmful effects of emissions). He encourages everybody to do the things we hear about frequently: drive less, eat less meat, make our homes energy efficient, etc. He also emphasizes that we *can* change our future, and cites several past successes in environmental policies. Acid rain in the northeastern U.S. was reduced by a factor of about 3 between 1994 and 2010 even as the amount of power generated rose -- *and* the cost of power remained about the same. Dissolved oxygen in the Delaware Bay near Philadelphia increased by a factor of about 3 between 1960 and 2000. And, the size of the ozone hole is now decreasing.

A discussion period, including audience questions followed the presentations and was moderated by Dr. Jana Davis. Jana is the Executive Director of the Chesapeake Bay Trust, a legislatively created non-profit grant-making organization that funds bay restoration and education. You may know the Trust as the manager of funds collected through the Bay plate, the Treasure the Chesapeake license plate program here in Maryland. Jana is a marine ecologist, holding a B.S. in biology from Yale University and a Ph.D. in Oceanography from the Scripps Institution of Oceanography. Jana's experience is focused at the intersection of science and policy: She has served as an American Association for the Advancement of Science Congressional Science Fellow in the United States Senate, a fisheries researcher at the Smithsonian Environmental Research Center, and a faculty member of the interdisciplinary Williams College-Mystic Seaport Maritime Studies Program.

PROTECTING MARYLAND'S SOURCE WATERS

By Ron Tate

Article 1

This is the first of a series of articles on protecting our source waters to be published in the CEPA newsletter.

What are source waters?

The EPA defines source waters as "untreated water from sources such as; ground water (underground aquifers), streams, rivers, springs or lakes in a watershed". It is used to provide public drinking water, as well as to supply private wells used for human consumption, including agriculture. Some water treatment is usually necessary, so public utilities treat most of the drinking water before it enters the home. However, those who get water from private wells are left to provide their own treatment. The cost of this treatment, as well as the risks to public health, can be reduced by protecting source water from contamination. Protecting drinking water sources usually requires the combined efforts of many partners such as public water systems, communities, resource managers, businesses and individuals as well as the EPA, other federal agencies, and state and local governments.

Where do source waters come from?

Water on the land and seas is constantly being recycled into the atmosphere by many processes, principal among them are: evaporation, sublimation, expiration and transpiration. Once in the atmosphere, the moisture eventually condenses and falls back to earth in various forms, bringing with it anything else present in the air (eg. gases, ions and particulates). This process of evaporation and precipitation is generally referred to as the water cycle.

Water has a fairly high mass, so it feels a strong pull of gravity toward the center of the earth. Water also has a low viscosity which makes it hard to deter in its path downward and allows it to quickly spread out seeking the path of least resistance in its downward journey. Water is the universal solvent -- almost anything will dissolve in it to some degree. The strong gravitational pull, along with water's mass and ability to dissolve substances means it pulls sediments and dissolved minerals along with it as it travels downward. These entrained materials give the water additional power to cut through hard surfaces as it continues on its way. If it is slowed, water pools, building up mass to push ever harder downward. Where the terrain is steep and composed mostly of loose rock, the water flows more quickly into the valleys. As the terrain levels out and becomes more compacted, the water flows more slowly and is more tightly confined, for the most part within banks and shores where the water is constantly trying to break free.

Streams, pools, rivers and lakes are the visible surface waters which form when confined waters cut channels into the earth's surface. These naturally occurring sources of water are often supplemented by reservoirs made by damming river and stream flow or developing other natural and man-made depressions to store additional fresh water for drinking supplies or other recreational and industrial purposes.

Aquifers are formed in the ground in soils with relatively large spaces between the grains, such as silt, sand, gravel and rock. Aquifers may be unconfined, where the water is free to move over a large area with relatively little resistance to flow, or confined, where it is more tightly restricted in movement by boundaries which are more resistant to flow. Aquifers are the primary component of ground water. Though contained within the ground, aquifer water continues to seek out the path of least resistance down toward the center of the earth, although, perhaps more slowly.

Throughout its journey, the water is exposed to mechanical and biological action and sometimes, UV radiation and aeration as well, all of which help to clean it, remove sediments, particulates and nutrients, and break down compounds dissolved in the water. Throughout its journey, water is consumed by numerous life forms. Water is the major component of every living thing, plant and animal. It is essential to life. These life forms utilize water to move nutrients throughout their systems and carry nourishment to every cell. Then they use the water to flush out the waste products from those cells, returning it to the ground and air.

The color of water

Fresh water is often identified with a color to distinguish the different general classifications as follows: [Some of these colors are also sometimes used differently to describe types of ocean water]

Blue Water – The combination of fresh surface waters and aquifer ground waters, also called source waters.

Green Water - The precipitation on land that does not run off or recharge the groundwater but is stored in the soil or temporarily stays on top of the soil or in vegetation. The green water which is held in the soil is also called soil moisture, the glue which keeps the soil from blowing away.

Grey Water - Water generated from domestic activities such as laundry, dish washing, and bathing, which can be recycled.

Black Water - Water which has been contaminated with human waste, also called sewage.

What are the threats to source waters?

Throughout most of the US, we have become accustomed to an abundant and cheap supply of fresh water. We use these waters for sport and recreation, swimming, bathing, washing, drinking, food preparation and processing, farming, mining, manufacturing and all too often, as an open sewer for trash and sewage, without thinking about the vital function they serve in our lives.

We wash ourselves, our pets and other animals, our vehicles, RV's, boats, houses, sidewalks, driveways, decks, clothes and linens to keep them clean and prolong their life. We fertilize and water our trees, shrubs, flowers, vegetables, lawns and house plants. We spray with pesticides, dump our pharmaceuticals down the drain and toss our trash on streets and lawns. Our roads, parking lots, driveways and building roofs provide large areas of impervious surface which collect and channel rain water, adding oils, antifreeze, salts, chemicals, carrion, waste and numerous other pollutants which collect on their surfaces. These waters eventually find their way into the ground water or creeks and streams along with the accumulated pollutants.

Sink holes and old wells which aren't properly sealed provide easy paths for pollutants to flow into the groundwater and aquifers. Drilling and mining operations often cut through groundwater channels providing easy paths for polluted water to mix into the groundwater. Pharmaceuticals are increasingly finding their way into our water supply along with other human waste from leaking septic systems, treatment plant overflow and other raw sewage discharges. Radioactive isotopes from nuclear plants, mining operations and naturally occurring formations in the ground are also of increasing concern. Various manufacturing processes generate toxic wastes. Even though plants in the U.S. are required to treat waste to remove known toxins, most monitoring is performed and reported by the processing plant.

Eventually source waters that are not used for drinking water find their way into oceans, bays and their tributaries and large rivers, often as waste water and runoff, laden with sediments, toxins and other contaminates.

The other big threat to source waters is overuse. If we withdraw water faster than nature can recharge it we use up what is stored in the ground. That is the situation we face today, with development increasing impervious surface and generating increasing demand for water, many of our aquifers have been drawn down to dangerously low levels, and at an increasing rate. This means that many wells that were drilled years ago and supplied good wate, have run out of water so new ones had to be drilled. Once excess water, stored in the aquifers, flowed into our bays and oceans, but when the water level drops too low salt water from our bays and oceans flows into our aquifers slowly degrading water quality. Similarly, where water once pushed out from the aquifers into surrounding soil, water is now drawn into the aquifer from the surrounding soil. Next time you take a drink, think about where that water has been.

How do we protect such a pervasive, precious resource?

Clearly, protecting these waters is a very complicated process and ultimately requires the understanding and cooperation of every one of us.

Currently, the Federal Government, through the US EPA, provides the primary impetus for protecting our source waters, deriving their authority primarily from two laws, the Clean Water Act (CWA) and the Safe Water Drinking Act (SWDA). These are laws that were passed by the federal government in recognition of the need to insure that this precious resource is protected and preserved.

Various state and local governments play important roles in carrying out federal requirements as well as making additional provisions to protect their waters. Citizens and private organizations also play a role in drawing attention to water issues, pressuring government into action, or initiating action on their own. But, there are great pressures to develop the land and exploit the water resources for profit and, currently, too little pressure from citizens to protect and preserve these resources.

In recent years, pollutants identified in our bays and rivers have been the focus of much attention. Limits are being set based on estimates of how much pollution these bodies of water can absorb and remain acceptably healthy. This has sparked many debates about the value of these waters and the bio-mass they contain verses the cost of properly controlling the processes which generate the pollution. However, the cost of controlling pollution pales in comparison to the value of our source waters, which are vital to all our lives.

Article 2 of **Protecting Maryland's Source Waters** in the next newsletter will discuss the EPA and the role of the federal government in protecting our source waters.

Dimensions of the Chesapeake

By Richard L. Dunn

This is the first of what it is hoped will be a series of short articles looking at the Chesapeake Bay and its region from more than just a statistical or linear point of view. The Bay has a length, depth and breadth that can be measured. It also has other dimensions. The Bay has an existence in time: geological time, historical time and a future in time. The Bay has influenced and been influenced by the cultures and civilizations on its shores and those farther afield. Seemingly unconnected facts and events may have connections that are less than obvious, but once revealed may expand our understanding and appreciation of the Bay and its resources.

I spent many summers of my youth at a family summer cottage on the Choptank River, upstream from Cambridge. I never gave much thought to the fact that a nearby stream was called Indian Creek. I heard stories of people finding Indian arrowheads but never found any myself. I never made the connection that wading for soft crabs or digging for clams was something Indians had done in the same spot hundreds of years before. Indeed, the land our cottage stood on had been an Indian reservation actively occupied by natives until the closing years of the eighteenth century.

Moreover, it took many years and exposure to a novel written by John Barth for me to realize that the strange speech pattern heard among the farm hands and watermen of lower Dorchester County was not a peculiar "southern" drawl but a highly corrupted form of Elizabethan English.

The early English settlers of the lower Bay, John Smith among them, found Indian summer fishing camps on the low lands between the James and York rivers in the area around Poquoson (Powhatan word for "swamp"). These camps persisted for hundreds of years thereafter, first occupied by Indians and then by white watermen in communities with near tribal subcultures of their own. A major facet of the native way of life was building watercraft, primarily dugout canoes. These were made from a single log. English settlers bought or adapted Indian canoes or made their own using metal tools.

After many decades the original native design evolved in the hands of postcolonial watermen and a local "log canoe"-building industry appeared. In the new design two, three or more logs were joined together and then hollowed out to form a single, well-designed sailing hull. These evolved canoes originally built in the lower bay were soon built in many locations around the bay. They became the backbone of the Chesapeake sailing oyster industry well into the nineteenth century, with remnants persisting into the twentieth century. A number are still afloat. Their use today is recreational rather than commercial.

In the 1800's a European innovation was added to the evolved native design, the centerboard. This keel-like member could be raised or lowered, depending on sailing conditions. When adapted to the log canoe it proved highly utilitarian. Using a centerboard, a log canoe could sail well into the wind without the use of a heavy fixed keel. In the bay's shallow waters this was an especially useful adaptation. Log canoes were thus the progenitors of the centerboard commercial or pleasure watercraft that abound on the Bay today.

In addition to oystering, watermen used their log canoes for racing. They used progressively larger sails to the point

where, not having ballast, they were much too tender. They started adding planks for crew members to hike out on, and log canoe races can still be seen today using planks.

[source notes: Barth, The *So-weed Factor*; Rountree et al, *John Smith's Chesapeake Voyages*]

HOW-TO HINTS

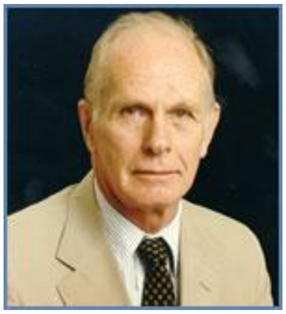
By Ron Tate

Preparing Plant Beds

The key to healthy plants is establishing healthy plant beds. Proper bed preparation requires that the soil be loosened and amended to meet the plant's needs. Plants like soil that is loose so that the roots can spread quickly and deeply. Plants need nutrient-rich soil, moisture, and air to transport the nutrients, provide atmospheric nitrogen for the plants, and oxygen for the organisms and microorganisms in the soil that break down compounds into more simple forms that plants can use. It's not just about the plants, it's an entire ecosystem. In general, addition of organic matter is beneficial because it provides nutrients as well as loosening the soil and improving water retention and air and water penetration. Proper acidity is also important to maintaining a healthy environment for plants and their support organisms. A pH of 6.5 to 6.8 is best for nutrient solubility for plant uptake, although some plants like a more acid soil. Seaweed also makes a good addition, providing a variety of micronutrients and growth hormones not normally provided by other amendments and fertilizers. Plants also need nitrogen and phosphorus to grow so a small amount of fertilizer can help start a bed. *Note: Test kits and less accurate meters are readily available to test soil pH. A complete soil test is generally recommended to understand the particular needs of your soil.*

Problem soils need more careful assessment to determine the required amendment for best performance. Organic material, in the form of compost, is the best amendment. Uncomposted organic material can be used to a limited extent, but it takes a long time to break down and competes with the plants for nitrogen in the process. Inorganic substances such as perlite, vermiculite, sand and gravel can be used to loosen harder soils. Gravel can make for hard digging. Initially beds should be turned over and amended to a depth of 6 to 8 inches. It may take 2 to 3 years for a new bed to become fully established, but good compost will jump start the process. A layer of mulch over the bed will help reduce weed growth and aid in water retention. Once a bed is established, it is a good idea to turn over the top few inches every year or two, in the spring, working in the previous year's mulch and adding new mulch on top. This is where the use of natural mulch pays off. Although synthetic mulches may last for years, they do not provide a source of nutrients to enrich the bed.

IN MEMORIUM



Stuart Pittman

Shortly after the last newsletter was issued, in which an article about Steuart Pittman was featured on the occasion of his retirement from CEPA, we were saddened to learn of his death on February 10th. The apparent cause of death was a stroke. He died on his farm in Davidsonville at the age of 93. The Annapolis Capital called him a "champion of land preservation and the environment." Please refer to CEPA's Winter newsletter for a summary of his career and accomplishments.

He is survived by his wife Barbara, four children from his first marriage to Antoinette Pinchot: (Andrew, Nancy, Rosamond, and Tamara), three children from his present marriage (Patricia, Steuart, Jr., and Romey), and 15 grandchildren.

A memorial service was held on Saturday, March 16 at the Marlboro Hunt Club.

PROFILE OF A TRUSTEE

Irene Hantman

Irene is CEPA's newest Trustee. She was born in Washington, DC, and grew up in Bethesda. She graduated with undergraduate and graduate degrees from Rutgers University. At age 36 she decided to go to law school, and consequently graduated with a law degree from University of Maryland.

Irene is an independent counsel at Verdant Law in Washington DC. She specializes in the domestic regulation of chemicals and has written extensively on these issues. She advises clients on the practical implications of final and proposed state and federal legislation and regulations. Her practice also includes enforcement defense. Irene joined Verdant after working at the EPA's Waste and Chemical Enforcement Division enforcing the Toxic Substances Control Act and the Resource Conservation and Recovery Act.

Irene also teaches writing in practice at the University of Maryland School of Law. The course focuses on helping students develop the ability to distill complex legal developments and regulatory issues. She has also taught the course at EPA's National Enforcement Training Institute.

Irene lives in Edgewater where she has been involved in numerous civic efforts with the County Office of Planning and Zoning, Lower Western Shore Tributary Team, Lee Farms Conservancy governing board, and her neighborhood Community Association. She received a Governor's citation for her work on State Bay restoration efforts. She describes herself as a bookworm, and admits to being a rabble rouser.

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