



## **Our Homes, Rainwater, and the Chesapeake Bay**

By Lili Sheeline<sup>©</sup>

The Chesapeake Bay watershed – 64,000 square miles encompassing six states, DC and nearly 17 million people – is the largest estuary in the United States, fed by more than 100,000 streams, creeks, and rivers.

As residents of the watershed, we all live near one of these tributaries, and whenever we open a faucet, flush a toilet, or drive a car; or whenever rain runs off our roof, driveway or sidewalk, we export waste, sediment, chemical contaminants, and excess nutrients to the Bay. Approximately 17 percent of the phosphorus, 11 percent of nitrogen, and nine percent of the sediment that empties into the Bay comes from snowmelt and rainwater runoff in particular.

Increased runoff after heavy storms and the faster flowing water that results also cause more severe erosion. And while area wastewater treatment systems filter and clean sewage waste before releasing it into the tributaries, periodic overflows caused by hard rains (or system failures) allow raw sewage to flow into streams and rivers.

How big a problem is this locally? In DC alone, residential properties including multifamily units represent more than 35 percent of the city's impervious surface area (rooftops, driveways, sidewalks, concrete patios, and any other hard surfaces where precipitation cannot reach the soil.) It's a problem that's growing: throughout the watershed, population increased eight percent in the 1990s while the impervious surface area increased by 41 percent.

Industry and agriculture also add to the problem as do the shortcomings of DC's sewer system, where approximately one-third of the sewer system combines stormwater and wastewater in a single pipe. This makes the system vulnerable to overflows during hard rains and allows untreated sewage to flow to the bay.

### **What Does This Have To Do With REALTORS<sup>®</sup>?**

Local residents can significantly help to restore the health of the Bay by redirecting rainwater runoff around their homes into the soil. In DC and Montgomery County alone, more than 1.5 million people reside in over 650,000 homes, and GCAAR's 8,700-plus members have helped nearly 250,000 clients buy or sell homes in Montgomery County and DC over the past 10 years. Considering these numbers, as REALTORS<sup>®</sup> we are in a unique position to be a resource regarding this issue. The more educated *we* are, the more we can be a resource to our clients and fellow residents of the Chesapeake Bay

watershed. Regardless of whether we personally consider these issues to be important, many of our clients do.

### **The Impact of Runoff**

The Chesapeake Bay is home to 3,600 species of plants and animals; although it's one of the shallowest estuaries in the US, it yields the greatest harvest of fish and shellfish, providing more than 500 million pounds of seafood annually. It is the spawning and nursery ground for 70 to 90 percent of Atlantic striped bass ("Rockfish"), the most important commercial and recreational fish in Maryland. Yet despite the Bay's local and regional importance, in 2008 it scored only 28 out of 100 in a health assessment by the Chesapeake Bay Foundation – a failing grade caused, in large part, by the infusion of nutrients, sediments, and contaminants carried into the Bay by runoff.

*Nutrients*, especially phosphorus and nitrogen, are necessary for animal and plant survival. However, at excessive levels they fuel the growth of dense algal blooms that block sunlight from the shallow water, thus choking out the growth of underwater bay grasses – essential food and shelter areas for fish and shellfish. These blooms also devour oxygen in the Bay's waters, depriving estuarine life of another basic necessity for survival.

*Sediments* consisting of clay, soil and sand, also are a natural part of the Bay's ecosystem but occur at such levels today that they are one of the leading causes of pollution. Excessive sedimentation clouds the water, keeping sunlight from reaching bay grasses. Sediment particles also bind with nutrients and chemical contaminants, spreading them throughout the Bay and, ultimately, contaminating bottom-feeding and -dwelling species (including many that we like to eat.) Settled sediments also smother bottom-dwelling species like oysters.

*Chemical contaminants* are picked up as water runs across lawns, roads, and parking lots and into storm drains and nearby tributaries. Included in this brew are organic compounds that have been banned from production for decades ("legacy pollutants"), such as DDT and PCBs, as well as metals such as mercury (the most common metal in the watershed.) Because of the persistent nature of these contaminants, many remain in the environment for extremely long periods, accumulating in organisms as they move through the food chain and, ultimately, ending up in our seafood. (Some chemicals, called endocrine disruptors, are believed to be the cause of "intersex" fish in Chesapeake tributaries. They come from agricultural runoff as well as wastewater treatment plants, where they typically are not removed prior to release of the water.)

### **How Can Homeowners Help Control Runoff?**

Most of the pollution to the Bay comes from runoff, so measures to redirect water from our roofs and driveways contribute significantly to improving the health of the Bay. The most common methods for controlling residential runoff include rain barrels, rain gardens, planting shade (or canopy) trees, gardening with native plants, pervious paving, and green roofs.

**Rain Barrels** collect rainwater from a roof via downspouts and store it for later use – for watering lawns and gardens, filling ponds or fountains, washing cars, etc. – and can be homemade or purchased in various sizes, shapes, and colors. Design is important to ensure efficiency, properly directed overflow, and mosquito deterrence. In addition to helping water quality in Chesapeake Bay and its watershed, benefits include: lower water costs (one barrel saves approximately 1,300 gallons of water during peak summer months); recharging the groundwater supply and, for DC, less pressure on the sewer system.

**Rain Gardens** are strategically located gardens that use a particular soil mix and specific plants – usually native but also ornamentals – to absorb and store rainwater. They typically retain 30 percent more water than conventional lawns. Other benefits include easier, lower-cost maintenance (less fertilizer, irrigation, and fewer pesticides); soil stabilization/less erosion; enhanced habitat for birds, butterflies, and beneficial insects; improved flood and drainage control; and increased home values thanks to attractive, low-maintenance landscaping. Design and location are important – soil type, plants, and site selection vis-à-vis slope and drainage all add to its effectiveness.

**Shade or Canopy Trees** – trees over 25 feet tall with wide, dense canopies – include oaks, maples, ashes, and elms. Trees absorb greater quantities of water for their own use but also increase the soil's capacity to hold water. In addition to improving the water quality of the Chesapeake Bay, benefits include: low maintenance; shading that can help lower energy costs (site selection is important to maximize this benefit); and improved air quality and wildlife habitat.

**Native Plant Species** for a region have evolved over thousands of years and are better suited to local climates than introduced plants. Native species need less fertilizer, pesticides and herbicides to thrive. Devoting more yard space to native species – and less to conventional turf grass – captures more water in the soil and releases it more slowly, lowers costs to the homeowner, decreases maintenance time and expenses, and provides wildlife habitat for birds, butterflies, and insects.

**Pervious Paving** uses materials like porous concrete that allow water to pass through them, or designs that allow water to seep around solid materials and soak into the soil. Patios, walkways, and driveways – surfaces typically made of impervious materials like concrete, mortar-filled brick, and asphalt – are excellent sites for pervious paving. In addition, pavers made of porous materials like interlocking concrete, grass, and gravel, come in various shapes, colors, and forms and can be more aesthetically pleasing than conventional pavement. Pervious paving increases the natural irrigation of yards, promotes groundwater recharge, reduces flooding and erosion and can help alleviate basement-flooding issues.

**Green Roofs** are, essentially, gardens that just happen to be on top of houses. They are most appropriate for, though not limited to, flat rooftops, and the slope and construction of the existing roof, plus local climate, plant selection, and irrigation systems, are all

important design considerations. Components include water proofing, root containment systems, a drainage system, filter cloth, a lightweight growing medium and, of course, plants. Green roofs can be found in standard, modular designs, or can be custom-built on a roof. They have as much as twice the lifetime of a conventional roof, reduce heating and cooling costs, deaden sound, improve air quality, reduce groundwater runoff, and provide welcome garden space for yard-deprived city dwellers.