

Green Infrastructure

Background

Historically, communities in the Chesapeake Bay watershed have relied mostly on “grey” infrastructure to manage environmental issues. These are man-made structures such as storm drains, seawalls, reservoirs and other installations that don’t naturally exist within our environment. While these features have served us well in the past—and in many cases, continue to play a role in safeguarding homes and businesses—they are not always the best solution for building sustainable communities that are resilient to the effects of climate change.

The Chesapeake Bay community of the future will include both grey and “green” infrastructure practices, which are features that mimic the natural world in order to resolve environmental issues. Green infrastructure can include mostly man-made installations such as green roofs, permeable streets and rain barrels, enhanced or repaired natural resources such as streams, wetlands and shorelines, or the development of new natural resources such as riparian buffers and oyster reefs.

The benefits of green infrastructure

Green infrastructure can be utilized to reduce flooding, keep nutrient pollution from entering waterways, and manage stormwater runoff, among other benefits. But unlike grey infrastructure, green infrastructure offers a wide-array of additional community, environmental and economic benefits. A wetland, for instance, will mitigate floods by absorbing wave energy, but it will also sequester carbon, provide habitat to wildlife and absorb nutrient pollution, whereas a bulkhead or seawall would just fend off floods.

Similarly, grey infrastructure tends to have more negative side-effects than green infrastructure. For example, bulkheads, which are designed to keep shorelines from eroding, can actually erode the beaches in front of them—whereas a living shoreline, the natural remedy, would be more resilient to the effects of erosion.

Green infrastructure in the Chesapeake

The Chesapeake Bay Program employs a variety of small-scale and large-scale green infrastructure solutions to meet the goals and outcomes of the *Chesapeake Bay Watershed Agreement*. Our partners are working with local government officials, landowners and homeowners to remake our communities to be safer, more sustainable and more resilient in the face of climate change.

Living shorelines

Natural shorelines throughout the Bay have been “hardened” with docks and piers for industry, and bulkheads and stone revetments meant to reduce erosion or keep waves from flooding the land. But in many instances, these solutions cause more harm than good. Partners at the Bay Program are working to restore these coastal areas to their natural state, which are called “living” shorelines. Installed in key places along the Bay’s shores and rivers, living shorelines are more resilient to storms and large waves, soak up the nutrient pollution and sequester carbon, in addition to number of other co-benefits.

Green streets

A “green street” is a residential area that includes a number of practices designed to manage stormwater runoff and flooding. This often includes streets that are replaced with permeable material that can soak up water or allow it to pass through gaps between brick-like structures and into the ground, unlike concrete. Green streets can also be lined with trees and rain gardens positioned in strategic locations to absorb runoff.

Tree canopy

Whether they’re lining streets in a city or filling large swaths of forest, tree canopy is vital to the protection of the Chesapeake Bay watershed. Trees absorb nutrient pollution, stabilize stream banks, sequester carbon, among other benefits. Partners of the Bay Program are conserving existing tree canopy as well as planting trees in both rural and urban areas where water quality is a concern.

Wetlands

The Chesapeake Bay watershed was once filled with wetlands—the vegetated area between land and water—but many have been and continue to be drained for development, and more recently, flooded due to sea level rise. The Bay Program is enhancing and restoring wetlands by planting marsh grasses and preserving existing areas to save them from development. As a form of green infrastructure, wetlands reduce floods by absorbing wave energy, soak up nutrient pollution that flows from the land and store carbon, as well as a number of wildlife benefits.

Riparian buffers

Riparian buffers are the trees, shrubs and other plants that grow next to streams and rivers. Planted across the watershed, often on agricultural properties, these installations absorb nutrient pollution, stabilizing streambanks to keep them from eroding, and cool down streams which reduces the probability of harmful algae blooms.

Oyster reefs

Oyster reefs are underwater structures where oyster spat can grow and form colonies. We can help oysters form reefs by laying down hard substrate such as concrete, followed by another layer of oyster shells, where the oysters can develop their natural habitat. As a green infrastructure tool, oyster reefs not only support the oyster populations—which filter water and improve its quality—but they also serve as natural barriers that reduce wave energy and therefore flooding. Oyster reefs also play an important role in protecting and building coastal marshes and seagrass beds, which can in turn can help reduce flooding and erosion.

Home installations

There are smaller-scale green infrastructure that homeowners can install to reduce stormwater runoff, lower energy usage and contribute to flood mitigation. This includes rain barrels, rain gardens, green roofs, solar panels, permeable pavers, among others. There are various programs that help homeowners install and finance these features, especially in highly urban and suburban areas where stormwater runoff is a concern.

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