Green Infrastructure

In Pinellas County, we're surrounded by water. Protecting the quality of that water is a top priority. Clean beaches and bays are critical not only to wildlife, but also to residents and tourists and the overall economy.

Our countywide Strategic Plan calls upon us to practice superior environmental stewardship. One way we can do that is to increase the use of green infrastructure.

What is Green Infrastructure?

Green infrastructure describes practices that create habitat and allow rainwater to filter through vegetation and soil rather than running into storm drains. When rain falls in undeveloped areas, the water is filtered by plants and the ground. In traditionally built areas, much of the rainwater can't soak into the ground because of pavement or buildings (impervious cover). Green infrastructure helps rainwater be filtered more naturally, minimizing the impacts of development on the environment and reducing long-term costs of treatment and maintenance. Green roofs, bioswales, pervious pavement and living shorelines are examples of green infrastructure.

Green Infrastructure vs. Gray Infrastructure

Gray infrastructure describes older methods of stabilizing shorelines and managing rain water by collecting and directing it away from developed areas using curbs/gutters, pipes and storm drains. Gray infrastructure lacks habitat and dumps stormwater into nearby waterbodies—a major cause of pollution in lakes, bays and the Gulf of Mexico.

Managing stormwater and shoreline protection with green infrastructure not only reduces water pollution, but also creates a healthier urban environment by providing habitat for wildlife, flood protection, cleaner air and cleaner water.

How Impervious Cover Affects the Water Cycle

Natural Ground Cover
40% Evapo-Transpiration
10% Runoff
25% Shallow Infiltration
25% Deep Infiltration

10-20% Impervious Surface
38% Evapo-Transpiration
20% Runoff
21% Shallow Infiltration
21% Deep Infiltration

35-50% Impervious Surface
35% Evapo-Transpiration
30% Runoff
20% Shallow Infiltration
15% Deep Infiltration

75-100% Impervious Surface
30% Evapo-Transpiration
55% Runoff
10% Shallow Infiltration
5% Deep Infiltration

Economic, Environmental and Social Benefits

Green infrastructure has many benefits, including:

- **Improved water quality:** Stormwater filters through plants and soil at or near its source, reducing pollutants.

- **Reduced flooding and erosion:** Runoff is greatly reduced because more water is absorbed where it falls, which in turn reduces flash flooding and erosion issues.

- **Habitat restoration:** Florida-Friendly plants provide food and/or a place to live for wildlife in an increasingly urban environment where non-native turf grass dominates the landscape.

- **Increased groundwater recharge:** Rainwater filters through soil at its source, replenishing groundwater.

- **Cooler temperatures:** Less asphalt and concrete reduces the urban heat island effect.

- **Less impact on the climate:** Plants absorb carbon dioxide, a greenhouse gas.

- **Enhanced community aesthetics:** Landscapes with green infrastructure can result in higher property values and faster property sales.

- **Reduced energy use:** Tree shading and green roofs lead to lower air conditioning use. More planted areas require less lawn mowing. Less gray infrastructure reduces the amount used on making/transporting materials like concrete.

- **Decreased air pollution:** Trees and plants clean the air. Reduced energy use leads to lower power plant emissions.

- **Educational opportunities:** Green infrastructure sites can include informational signs and be used as outdoor classrooms, which educate the public about important environmental issues.

- **Expanded community value:** More green space can lead to greater recreational opportunities.

🜄 Types of Green Infrastructure

*Largo Mall **pervious pavement***

*MacDill AFB **living shoreline***

*Pilaklakaha Ave. (in Auburndale, FL) **bioswale***

Bioswale: A ditch or swale that has been modified and planted with Florida-Friendly vegetation to increase pollutant removal and water infiltration.

Vegetated filter strip: Vegetated area designed to capture and filter stormwater while also absorbing carbon dioxide.

Rain garden/bioretention cell: A shallow depression, constructed or natural, planted with Florida-Friendly plants designed to receive and filter stormwater runoff.

Trees to intercept rainfall: Leaves in the tree canopy capture water, reducing runoff.

Tree filter box: Reservoir containing gravel, soil, and vegetation (such as trees) designed to collect and filter stormwater.

Pervious pavement: Pavers or other porous surfaces designed to allow stormwater to filter through and into the ground underneath.

Green roofs: Planted roofs that capture rainwater and reduce runoff from the roof, while also reducing energy use and absorbing carbon dioxide.

Stormwater harvesting: Cisterns that capture and store rainwater for later outdoor use, such as to irrigate non-edible plants.

Living shorelines: Natural materials such as rocks, plants, and oysters are used to prevent bank/shoreline erosion, providing habitat and improving water quality.

## 🜄 How Green Infrastructure Can Benefit a Community

In Venice, Florida, (Sarasota County) a dune treatment system that includes bioswales is removing 91 to 100 percent of nitrogen, phosphorus, sediment and bacteria pollution from stormwater before it discharges into the Gulf of Mexico. Health warnings at Venice Beach have been drastically reduced since the installation in 2015.

***Bioswales** in Venice, Florida. Photograph courtesy of the City of Venice.*

*Largo Highland Recreation Center **rain garden***
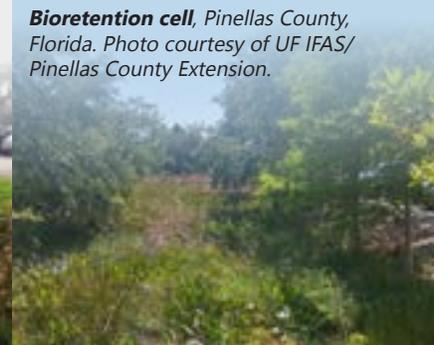
***Bioretention cell**, Pinellas County, Florida. Photo courtesy of UF IFAS/ Pinellas County Extension.*

🜄 Potential Cost Savings

• Reduces the amount of expensive gray infrastructure required, such as curbs, gutters and pipes.

• Reduces or eliminates the need for large stormwater ponds and minimizes the pipes required to move stormwater.

🜄 Maintenance Benefits

• Green Infrastructure used to manage stormwater is designed to return to dry conditions within 24 to 72 hours, which prevents mosquito breeding.

• Plants selected will be resistant to both drought and temporarily submerged conditions, will not require watering once established, and will not require the use of fertilizer or other chemicals. Weeding and other incidental maintenance can be done by volunteers, homeowners associations or county staff/ contractors, depending on the situation and level of interest.

The Pinellas County Public Works is encouraging the use of green infrastructure. Staff are happy to work with developers and homeowners to explore new opportunities for green infrastructure in the County. For more information, refer to the Pinellas County Stormwater Manual: www.pinellascounty.org/Plan/pdf_files/ PC_Stormwater_Manual.pdf or call (727) 464-8900.

For more information, visit us online at **www.pinellascounty.org/ PublicWorks**.