TOP TEN THINGS TO KNOW SERIES

Let Nature Be the First Line of Defense.

NATURAL INFRASTRUCTURE

coast.noaa.gov/digitalcoast/topics/green-infrastructure

Need an effective solution for minimizing coastal flooding, erosion, and runoff? Look to natural infrastructure!

Natural infrastructure is a proven and cost-efficient approach. The components vary (mangroves, wetlands, oyster reefs, and sand dunes; permeable pavement and bioswales; green roofs and rain barrels; and natural areas incorporated into city designs), but the basic premise stays the same: slowing and absorbing floodwaters.

Listed below are ten helpful benefits.

1. **Buffers storm surge.** Natural areas such as dunes, oyster and coral reefs, mangroves, and wetlands protect coastal communities from powerful storm surge by buffering waves and absorbing additional water.
2. **Improves water quality.** Incorporating bioswales and permeable pavement filters runoff from roads and parking lots before it enters and pollutes streams, rivers, and the ocean.
3. **Reduces erosion.** Planting vegetation along hillsides near waterways reduces sediment flow that can harm aquatic wildlife.
4. **Adds a little green to the gray.** Mixing natural (green) infrastructure with traditional, man-made infrastructure (gray) is beneficial, particularly in an urban setting. Incorporating permeable pavement, rain gardens, green roofs, and other natural areas alleviates pressure on stormwater systems by removing harmful chemicals and excess water.
5. **Protects upland property.** One recent study documented the storm damage reduction power of marshes. In this study, salt marshes reduced nearby property damage by 20 percent when compared to property where salt marshes were lost.
6. **Protects wildlife habitat.** Protected and restored wetlands provide important migratory bird feeding grounds as well as other wildlife habitat, and serve as nurseries for fish and shellfish.
7. **Promotes a healthy lifestyle.** In addition to flood protection, wetlands and green space provide recreational opportunities. Think hiking, kayaking, bird-watching, and fishing.
8. **Is aesthetically pleasing.** Natural infrastructure just looks better. Living shorelines with shorebirds foraging for dinner along the coast win over a hardened shoreline any day. Same is true for the grassy swales and parks doing double duty.
9. **Improves the economy.** Tourists are drawn to recreational opportunities and aesthetically pleasing locations. So are new businesses! Natural infrastructure can translate into paper green (think dollars!) for the local economy.
10. **Allows everyone to participate.** From rain barrels to wetland restoration efforts, natural infrastructure is an idea that lets everyone—homeowners, businesses, students, and municipalities—get involved.

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Fun Facts

$23.2 Billion in Storm Protection

Coastal wetlands in the U.S. are estimated to provide $23.2 billion in storm protection services every year. Wetlands reduced damages by more than 22 percent in half the areas affected by Hurricane Sandy, and by as much as 30 percent in some states.

Living Shorelines Rock!

This stabilization technique relies on natural materials—often a combination of oyster reefs, sand, and vegetation. The approach can keep pace with sea level rise and be cheaper to build and maintain than gray infrastructure (hard erosion control structures). Added benefits: can improve water and air quality, can store carbon dioxide, and can self-maintain, self-repair, and self-recover.

Solutions Worth Billions

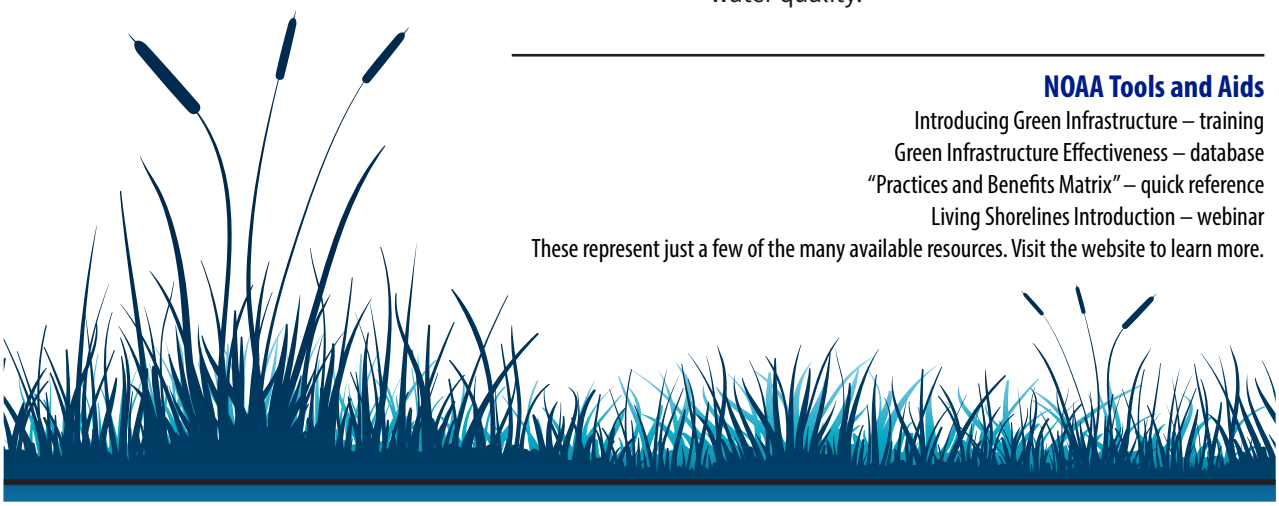
Natural infrastructure solutions could help avert more that 45 percent of the climate risk in the Gulf of Mexico over a 20-year period, saving the region over $50 billion in flood damages.

Powerful Protection

Oyster reefs and marshes act as natural barriers to waves, with 15 feet of marsh absorbing up to 50 percent of incoming wave energy.

Leading by Example

- **Mobile Bay, Alabama:** Two soon-to-be implemented oyster reef restoration projects should reduce wave height by 51 to 90 percent and reduce wave energy at the shore by 76 to 99 percent. The reef construction is anticipated to add $8.4 million to the local economy.
- **Muskegon Lake, Michigan:** Studies say that a wetland restoration and shoreline stabilization project for the lake should power up the local economy by more than $57 million, boosting property values by $12 million, bringing $600,000 extra in yearly tax revenues, and providing an extra $1 million annually in recreational spending.
- **Clear Lake, Texas:** A 200-acre reclaimed urban wetland—formerly an abandoned golf course—acted as a sponge during Hurricane Harvey, protecting residents and their homes from potentially deadly flooding.
- **Aurora, Illinois:** 28 rain gardens were installed at intersections in a storm sewer area in 2013, which saved the city an estimated $1.8 million.
- **Chicago, Illinois:** Implementation of green roofs and permeable pavement has provided the city with the capacity to capture over 85 million gallons of stormwater each year.
- **Faga'alu, American Samoa:** A community rain garden was created to reduce run-off and improve water quality.



NOAA Tools and Aids

Introducing Green Infrastructure – training
Green Infrastructure Effectiveness – database
"Practices and Benefits Matrix" – quick reference
Living Shorelines Introduction – webinar
These represent just a few of the many available resources. Visit the website to learn more.