

# Ecoshorelines on Developed Coasts

## Guidance and Best Practices

### Definition

New Jersey's Coastal Zone Management Rules define a living shoreline as a "shoreline management practice that addresses the loss of vegetated shorelines, beaches, and habitat in the littoral zone by providing for the protection, restoration or enhancement of these habitats" (N.J.A.C. 7:7-1.5). An urban ecoshoreline is a type of living shoreline with the key constraint of space. Urban infrastructure limits habitat development in these areas and, therefore, requires creative design principles to support project success.



Above: Harlem River Park (NYC) introduced curvature as seen by the shape of the fencing and terracing at the water's edge.

### Allow Light Penetration & Use Alternative Materials

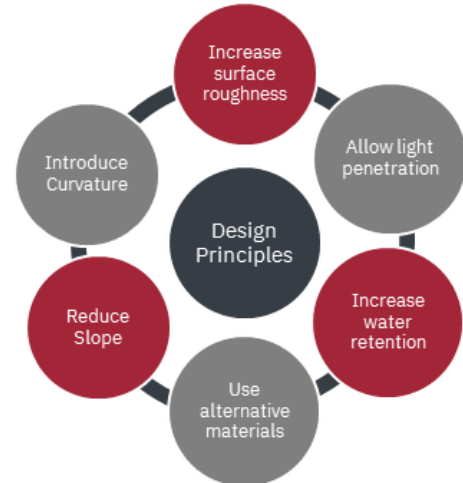
Light penetration is important for healthy marine habitats. Important photosynthesizing organisms require sunlight, and many nearshore species require light for specific behaviors. Alternative materials—such as translucent panels or others that limit shade—can be utilized to support adequate lighting. Vegetation can be added to traditional infrastructure to increase habitat value and improve aesthetics. Traditional materials such as concrete can often be modified at a minimal cost to provide ecological enhancement and improve structural performance.

Right: Seattle Seawall is covered by an overhanging sidewalk that incorporates translucent panels that allow for light penetration.



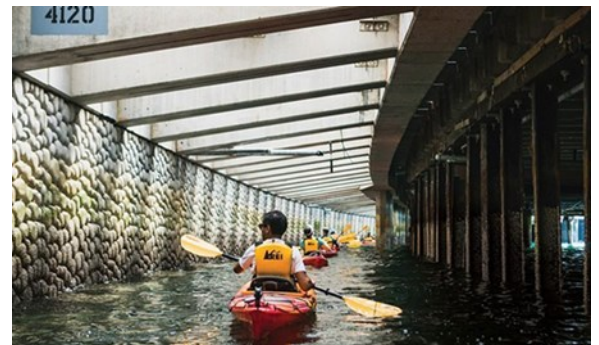
### Important Note

Including these design principles will benefit a project, but urban ecoshoreline design must also seek to preserve natural areas, be resilient and adaptable, be planned with the surrounding community, and include future monitoring plans. A well-designed ecoshoreline will withstand stressors associated with climate change, such as sea level rise. Consistent monitoring allows for improvements to be made and measured successes justify future projects.



### Introduce Curvature & Reduce Slopes

Many urban shorelines have been straightened to benefit transportation and upland development, but shoreline curvature protects native species from strong currents. However, before introducing curvature in high current areas, models should be developed to ensure other nearby structures are not negatively impacted. Urban shorelines typically have steep banks to support navigation and maximize upland use. Terracing creates layers of vegetation to support varied habitat and dissipate wave energy in a steep space. Shelves installed along steep shoreline banks also support vertical habitat growth.



### Increase Surface Roughness & Water Retention

Roughening the surface of the materials used in urban ecoshorelines increases the surface area available for habitat development and supports water retention which is required for organism survival. Further, colonizing species more easily attach and grow on textured surfaces thereby increasing biodiversity.

Left: A mat made of blocks of ecologically enhanced concrete demonstrates how varied texture and water retention supports plant growth.

Produced by: Jon K. Miller, Ph.D., Laura Kerr, Amy Bredes, and Katherine Gannon of Stevens Institute of Technology

For more information contact:  
Jon Miller, 201-216-8591, [jmiller@stevens.edu](mailto:jmiller@stevens.edu), [@StevensCoastal](https://twitter.com/StevensCoastal)

This work is made possible with financial assistance from the New Jersey Department of Environmental Protection and the U.S. Department of Housing and Urban Development through the National Disaster Resilience Competition.

September 2022