

# Why Decentralize Wastewater Treatment?

Traditional centralized wastewater treatment systems are increasingly demonstrating environmental, economic and social limitations that can't continue to be ignored. These energy-intensive and chemical-dependent systems are giving way to more sustainable approaches, with decentralization being a key component.

Decentralization takes into account basic principles of design in nature. "Traditional" wastewater systems circumvent natural patterns, sacrificing resiliency and efficiency for speed and size. Decentralized wastewater treatment disperses the resource closer to its source and minimizes surface discharges. Simply put, it is a way to "get back to nature" while using 21st century technologies and management.

Nature operates with patterns and principles that we can adapt to our treatment of water. Natural systems:

- create order from the ground up with modular units of design
- are multi-functional in their formation
- adapt and adjust to changing conditions
- are cyclic and recycling, using and reusing water and other resources
- create beauty and abundance with NO waste.

## DESIGN WITH NATURE

*We can cooperate with nature to rebuild healthy communities and restore natural systems through use of sustainable infrastructure designs and principles, with water at the center of these designs.*

*Emerging examples of these principles in action include:*

**Onsite and neighborhood cluster treatment:**

Small-scale technologies that mimic natural membranes and filters and that utilize soils and smart localized controls.

**Onsite and neighborhood reuse:** Closed-loop water systems in residential and commercial buildings, where stormwater and wastewater are treated and reused for landscape irrigation, toilet flushing and cooling, and where minimal waste leaves the site.

**Green infrastructure:** Rain gardens that trap stormwater and sustain trees and plants. These plants restore beauty and improve air quality in cities, moderate energy flows, and provide potential food sources.

**Smart Growth:** Patterns of neighborhood development that interconnect nature and the built environment, preserve open space and respect natural drainage flows.

**Green Cities:** Restoration of natural cycles of water infiltration and evaporation in cities and towns, through localized treatment and groundwater recharge, trees, parks and roof gardens, and stream daylighting and restoration.

**Watershed restoration:** Restoration of natural watershed flows and functions, through localized water use and recycling into natural wetlands, groundwater, and air. These systems will restore and preserve vegetation and wildlife, and minimize climate changes and warming.

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## BENEFITS OF DECENTRALIZED SYSTEMS

*Decentralized water and wastewater infrastructure creates the following benefits:*

**Lower costs for water supply:** Costly water supply enhancements can be avoided through onsite water use efficiencies, wastewater reuse, and rainwater harvesting. Impacts of droughts can be moderated.

**Lower costs of maintaining existing infrastructure:** Flow rates in existing water and sewer systems can be reduced through decentralized efficiencies and reuse in office buildings and infill developments.

**Lower costs for new infrastructure:** New developments can be accommodated with targeted small-scale infrastructure that is cheaper than centralized infrastructure.

**Greater resilience:** Small-scale treatment units are more resilient than centralized systems in hurricanes and floods, and less vulnerable to accidents and terrorism.

**Ecological restoration:** Decentralized systems can reduce the discharge of pollutants and replenish aquifers, restore streamflows and habitats.

**Resource efficiencies:** Small-scale treatment units can save on energy costs and recycle nutrients into landscaping and agriculture.

**Community benefits:** Green infrastructure has been shown to improve air quality, preserve open space, and create local jobs.

**Private financing:** Small-scale treatment units on individual properties can be financed privately, thereby saving money for municipalities.

### *References*

Material adapted from the “Baltimore Charter on Sustainable Water Systems,” signed in March 2007 by participants in a workshop by the Water Environment Research Foundation. The full text of the Charter is available at [http://www.ndwrcdp.org/userfiles/Balto\\_Charter.pdf](http://www.ndwrcdp.org/userfiles/Balto_Charter.pdf)

### *For Further Information*

For further information, go to <http://www.sustainablewaterforum.org/>

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